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## GUNBOATS FOR MEXICAN GOVERNMENT.

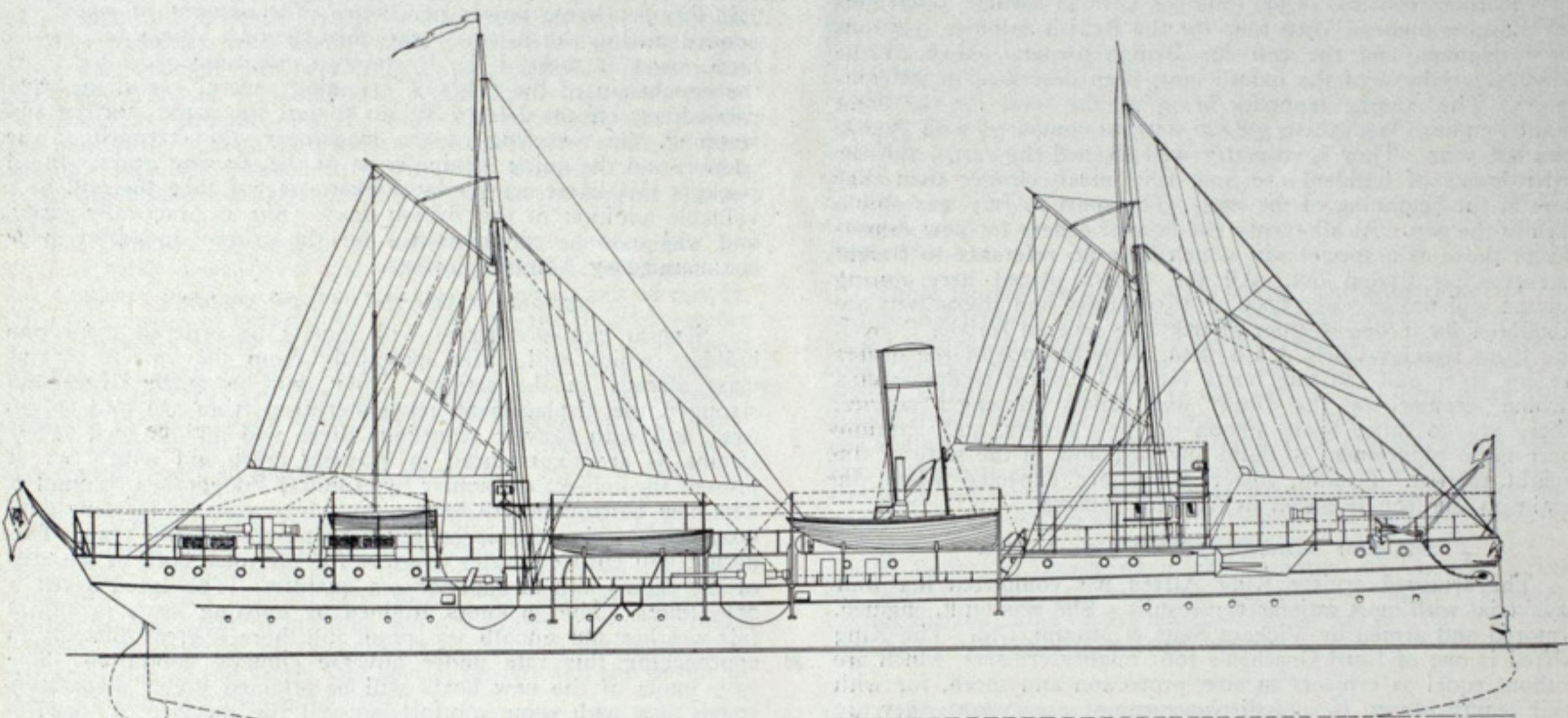
The United States Ship Building Co., at its Crescent ship yard, Elizabethport, N. J., launched the two gunboats, Tampico and Vera Cruz, on Monday of the present week. They are for the Mexican government and are also designed to act as troopships. The nearest approach to them in the American navy is the gunboat Machias. Their principal dimensions are: Length over all, 201 ft. 6 in.; length between perpendiculars, 190 ft.; breadth, molded, 32 ft. 10 in.; depth, 15 ft. 8 in.; draught, fully loaded, 10 ft.; displacement, 980 tons; speed, 16 knots. Their armament is to consist of four 4-in. rapid-fire guns, four 6-pounder rapid-fire guns and one torpedo tube. The hull is built of steel throughout and the vessels are fitted with cellular bottoms all-fore-and-aft, with peak trimming tanks at either end. Designed with an elliptical stern, ram stem and raised poop and forecastle, the ships have a decidedly pleasing appearance and with their shallow draught are well adapted for their work around the coast of Mexico. The problem of embodying in one design the fighting qualities of a first-class gunboat and the conveniences absolutely necessary in a troopship have been readily met in these wonderful little craft. The following brief description will give some idea of their design and equipment:

Two pole masts are stepped, one of which is fitted with a searchlight platform, and both of which are fitted with booms

cables is placed in the forward part of the forecastle. Ample facilities for quick coaling are given through numerous scuttles in the upper deck. A steam winch is provided aft on the upper deck for hoisting gear on board. The hammock berthing at the sides of the vessel on the upper deck gives storage accommodation for hammocks. On the berth deck, fourteen staterooms, four toilet and bath rooms, three mess rooms and attendant pantries, aft of the engines, give accommodation for the ship's officers, six engineers, ten cadets and one chief and sixteen troop officers. Forward of these the ice machine, refrigerating room, two powerful fans for ventilating the various spaces and pipe berths for 160 troops are provided, whilst at the bow of the vessel is located the torpedo room and discharging tube with air compressor and other appliances.

In the forward hold space is allotted for ninety troops in standee berths, forward of which are arranged the gunners, carpenters, boatswains and electrical stores and cable lockers. In the after hold magazines are provided for nearly 4,000 rounds of 4 and 6-pounder gun ammunition, together with bread rooms, paymaster's stores, sail room, etc.

The machinery is well protected above water by the arrangement of side coal bunkers, and the vessel is lighted throughout by electricity. There are two inverted, three-cylinder, triple-expansion engines fitted with Stevenson steam reversing gear.



Sectional View of the Gunboat Tampico for the Mexican Navy.

[Built at the Crescent Ship Yard, Elizabethport, N. J.]

for hoisting boats, coal, ammunition or stores. On the center of the poop deck a 4-in. rapid-fire gun is mounted, having a range of 120° from aft to forward. The double-hand steering wheels are placed at the fore end of the poop. A fore-and-aft gangway connects the poop and forecastle decks and upon skid beams at the same level are placed two steam launches, jolly boat, cutters and gig with special facilities for quickly lowering. On the forecastle deck is placed a nickel steel chart and wheel house for steam steering gear, forward of which is a 4-in. gun with a range of 120° from forward aft. A steam capstan for working the anchors, with a neat collapsible anchor crane, is also provided.

Under the poop, saloons and staterooms are arranged for the president when upon diplomatic service, also for the commander, second commander, executive officer, doctor and paymaster, together with dining saloon, pantry, office and toilet and bath rooms. Between the poop and forecastle, mounted upon sponsons, are two 6-pounder rapid-fire guns aft and two 4-in. rapid-fire guns amidships, with ammunition trunks from the magazines in close proximity. Within the boiler casings are installed three steam galleys for ship's officers, crew and troops, also the firemen's washplace. In the forward deckhouse is located a well-equipped sick bay, having the necessary bath, swinging cots and every surgical appliance.

Under the forecastle in separate rooms, nine warrant officers are installed, the remainder of the crew, numbering sixty, being berthed in hammocks. Portable mess tables and seats are provided for their use. A powerful steam windlass for working the

The diameter of the high-pressure cylinder is 14 in., the intermediate-pressure cylinder 22 in., the low-pressure cylinder 36 in. and the stroke 24 in. The exhaust from each engine passes to an independent condenser, which is placed outboard of the engine. In the engine room is placed an auxiliary feed pump, a fire and bilge pump, a sanitary pump, two air pumps, an evaporating and distilling plant and an electric light plant. The evaporator has a capacity of 2,500 gals. every twenty-four hours. This output can be directed to main boilers for feed water or to the fresh water storage tanks as may be desired. The electric light plant consists of two 7½ direct-connected generators of the direct current type. One is used for lighting the ship while the other supplies the current for the searchlights.

The boiler room is of the closed stokehole type with two 48-in. blowers to supply the air pressure for the forced draft. Two Mosher water-tube boilers supply steam at a pressure of 250 lbs. and have a total grate area of 81 sq. ft. The total coal bunker capacity is 170 tons under ordinary cruising speed. This would allow a radius of 2,000 knots, while under forced draft it would admit of a radius of 1,500 knots. In the boiler room there is located the main feed pump, a feed water heater, and above on the main deck level a donkey boiler of sufficient capacity to operate the auxiliary machinery when the main boilers are not in operation. Under the engine and boiler spaces in the inner bottom compartments is stored the reserve feed water for the boilers.

## SCOTTISH SHIP BUILDING LETTER.

Glasgow, Sept. 8.—There has been much bustle in the leading ship yards and much commotion in shipping circles during the last week or two. The bustle has attended the launching within a few days of such memorable specimens of marine architecture as the mammoth Cedric (Harland & Wolff) for the White Star Line, the biggest vessel in the world; the Holt liner Ningchow (D. & W. Henderson & Co.); the Blue Anchor liner Commonwealth (Barclay Curle & Co.); the Pacific Mail liner Victoria (Fairfield Engineering & Ship Building Co.); and the Anchor (Indian service) liner Massilia (D. & W. Henderson & Co.). All these were put into the water within a few days of each other. Indeed the last week of August was crowded with launches. The commotion in shipping circles was a general talkee-talkee over the completed South African and Canadian combine, and the suppositions, or projected, or impending Atlantic combine under the aegis of the Cunard Steamship Co., besides a number of other possible or impossible projects forming the talk of the hour.

The closing days of August were, as I have said, busy ones at the ship yards. The total launches in that month from the Scotch ship yards were twenty-two vessels of 46,900 tons. This compares with nineteen vessels and 32,000 tons in July, and with twenty-three vessels and 65,000 tons in August, 1901. The proportion of the Clyde yards was nineteen vessels of 45,550 tons and of the Forth yards two vessels of 1,220 tons, the balance belonging to the Tay. The output consisted of five twin-screw steamers of large size, thirteen single-screw boats, two screw tugs, one stern-wheeler and one steel barge. It included one vessel of 9,000 tons, one between 6,000 and 7,000 tons, two between 5,000 and 6,000 tons, two between 4,000 and 5,000 tons, one between 3,000 and 4,000 tons, one between 2,000 and 3,000 tons, and the rest below 1,000 tons each. Nearly 20,000 tons of the total was for Liverpool owners, 15,300 tons for London owners, 6,500 tons for Glasgow owners, 3,900 tons for the British colonies, 350 tons for foreigners, and the rest for British owners. Most of the principal products of the month have been described in previous letters. The August launches bring up the total for the eight months ending Aug. 31, to 338,800 tons, as compared with 354,830 tons last year. They have pretty well cleaned the yards, and the order books of builders are now very much cleaner than they were at the beginning of the year. The spurt in July was only a flash in the pan. At all events, the flow of orders for new ships—except those of a special sort which have no reference to freight markets—has fizzled out. All the orders placed here during August will not exceed 15,000 or 16,000 tons, and 10,000 tons are accounted for in one steamer of that size ordered for the P. & O. line from Barclay Curle & Co., Ltd. The balance of the orders are for river and coasting boats for well defined trades—and a turbine steamer for the Dover and Calais passenger service. There are no cargo boats among the new orders, and certainly there is no inducement to build any just now in the state of the freight market. Besides, lower prices are expected when the strain on the iron situation in America relaxes.

## TRIALS OF ARMORED CRUISER KING ALFRED.

The armored cruiser King Alfred has completed her four days' trial with most satisfactory results. She was built, engined, armored and armed by Vickers Sons & Maxim, Ltd. The King Alfred is one of Lord Goschen's four mighty cruisers, which are without equal as cruisers in size, protection and speed, for with their length of 500 ft. and displacement of 14,000 tons, they are the largest yet built. Their 6-in. hardened armor, extending for a length of 395 ft. and for a width of 11 ft. 6 in., affords shielding against attack from projectiles, and there is an extension of armor to the ram of lessening thickness but of increasing width. Notwithstanding this, and superior gun powder, the speed is 23 knots, which is realized by engines of 30,000 I. H. P., a total never before reached in naval ships, the King Alfred had all her guns on board, and completed her ordnance trials before returning to harbor. After a preliminary trial she steamed off on her first 30-hours' run, which was to be at 6,000 I. H. P. This was to determine coal consumption, which worked out 1.76 or 1 $\frac{3}{4}$  lbs. per indicated horse power per hour; which means that the vessel could steam to Australia with her ordinary supply of coal at an average of about 15 knots, for the speed on this trial proved to be 15.167 knots. This was determined over the new admiralty measured course of 8,678 ft. at Chesil beach, a site west of Portland bill. Four runs were made over this course, and the mean results were: Revolutions of engines, 72.26; power, 6,743 I. H. P.; speed, 15.167 knots. To complete the 30-hours' steaming the King Alfred proceeded down channel, reaching the Lizard at sunset, and noon next day found her at the anchorage at Spithead. The hourly readings of the running gave the following mean results: Draught of water, 26 ft. forward, 26 ft. 11 in. aft; steam in boiler, 220 lbs.; vacuum, starboard, 27.2 in.; port, 26.4 in.; revolutions, starboard, 70; port, 70.5; power, starboard, 3,249; port, 3,146—total, 6,395 I. H. P.; coal consumption, 1.76 lbs. per indicated horse power per hour; total water expended, 24 tons. On the following morning at daybreak the vessel was again under weigh for the second and severer test of 30 hours' steaming at 22,500 I. H. P. on the measured course near Portland. The mean results of six runs were as follows: Revolutions, 104.9; power, 21,450 I. H. P.; speed, 21.597 knots. Contin-

uing down channel two runs were made over the long course between Rame Head and the Dodman, when the speed was found to be 21.98 knots for just over 22,500 I. H. P. This is very satisfactory, especially as the vessel, having all her guns on board, with a great supply of coal, was loaded in excess of the normal displacement, her draught forward being 26 ft. 3 in., and aft 36 ft. 5 in., whereas the normal is 26 ft.

The following are the mean results of the 30 hours' trial: Steam pressure, 250 lbs; vacuum, starboard, 26.4 in.; port, 26 in.; total power, 22,605 I. H. P. of which the starboard engine, running at 106.6 revolutions, indicated 11,316 and the port engine 11,289 I. H. P.—very close results. The coal consumption worked out at 1.82 lbs. per indicated horse power per hour. The water expended was equal to 1.65 tons per 1,000 H. P. per hour, which proves that there was little leakage at the valves, and there was none at the boiler tubes or steam pipe joints. The King Alfred finished her official steam trials by an 8-hours' run at full power, and the results attained without any postponing of tests or without any mishap whatever, are considered most satisfactory. The vessel was over her designed draught, being on an even keel at 25 ft. 1 in. Leaving Spithead at 4 o'clock in the morning she steamed down channel and was put on the new admiralty course, when as the result of several hours it was found that the speed was 23.465 knots. The anticipated rate was 23 knots, so she is half a mile over contract. It is also better than was attained by the other ships of the class, the Good Hope and the Drake having steamed 23.05 knots. The King Alfred is now the fastest ship in the British navy (except torpedo craft) and the speediest armor-clad vessel in the world. The mean power on the 8-hours' trial was 30,893, of which the starboard engine contributed 15,170 I. H. P., having averaged 118 revolutions, while the port engine, making 119.6 revolutions, indicated 15,723 I. H. P. The mean steam pressure was 283 lbs., and boilers and engines worked satisfactorily throughout. The coal consumption worked out at 1.81 lbs. per horse power per hour. The amount of water expended during the 8 hours was only 39 tons, which for such a high power as 30,893 I. H. P. shows a minimum of leakage. At the conclusion of the 8 hours' steaming several evolutions were carried out off the Isle of Wight to test the rapid starting and stopping, the reversing of the machinery, the strength of the rudder, and the quick manipulation of the steering gears. In all respects this latest cruiser by Vickers proved that she will be a valuable addition to the British navy. She is practically ready, and will soon be commissioned for the cruiser squadron to be commanded by Admiral Fawkes.

## SEVERAL DESTROYERS OF NEW DESIGN.

Several new destroyers will shortly be ordered from ship builders which will differ materially from the vessels of this class already in the service. They will be much larger and stronger, the displacement being increased from 330 tons to 550 tons, and with heavier scantlings there will not be such severe strains as are experienced in existing craft and which are at present the subject of inquiry by Admiral Fitzgerald's committee. The new destroyers will have a high forecastle, as in some gun-boats, and will not ship so much water as the old type. This design will ensure greater comfort for the men, both in the area of the cabins and in superior sea qualities. The speed asked is 25 $\frac{1}{2}$  knots. The 30 knots attained by existing boats is only a fair weather and smooth sea speed, and there is great difficulty in approaching this rate under adverse climatic conditions. The 25 $\frac{1}{2}$  knots of the new boats will be attained under moderately rough seas with some comfort, so that the sacrifice of speed is more nominal than real.

The navy boiler committee's recommendations are criticised in a report by the chief dock yard engineer of the Austro-Hungarian navy, who has been associated with various types of boilers passed through his hands for repair and overhaul. The Babcock & Wilcox boiler, he says, is in no way superior to the Belleville. It is heavier, it does not allow free expansion of the tubes, it has large water chambers which might possibly explode, and it requires more room in the ship, because it must be made accessible from both ends. Of the two older types of boilers he prefers the Belleville; but in the Austrian navy there are no steam generators of this type. The Durr and Niclausse boilers, according to this authority, have no special advantages over the Belleville boiler, except in their capability of allowing damaged tubes to be easily replaced, whilst the water circulation in the boilers in consequence of the reduced section necessitated by the employment of an inner tube is undoubtedly worse than in boilers without inner tubes. He does not think, therefore, that a boiler with inner tubes will ever be generally introduced on board the warships of the several powers. "If the navy boiler committee, however, on grounds which are unknown to me," he continues, "recommend the introduction of one of these two types of boiler, then the Niclausse boiler should decidedly have the preference. It is considerably lighter than the Durr boiler, has no large headers, and needs to be accessible from one end only. Matters are different with the Yarrow boiler, which in consequence of its simplicity and cheapness, of the ease with which all repairs can be executed on board ship, of the cheapness with which the cleaning of its internal surfaces can be carried out, and of the cheapness of its installation, possesses considerable advantages over all other types of water-tube boilers." This type of boiler in its latest development, with large tubes, closed ashpits, and using

warm air, he considers undoubtedly the best among the types of water-tube boilers at present in use, and he would install Yarrow boilers exclusively in new ships. He regards with disfavor the innovation in the Yarrow boiler of curved tubes in the two rows nearest the fire, where frequent withdrawal for examination is imperative. The Belleville boiler, he reports, has always worked well. I merely present, without prejudice, these views of an Austrian engineer upon an interesting problem of the day.

#### REMARKABLE CANVAS EQUIPMENT.

The most remarkable canvas equipment ever prepared for a schooner, or in all probability for any other sailing vessel, is that made by the Rowes of Gloucester, Mass., for the big steel seven-master Thomas W. Lawson which was lately launched from the yards of the Fore River Ship & Engine Co., Quincy, Mass. The Lawson's canvas will be subjected to an unusual strain, being of tremendous spread and having a huge bulk to move. The equipment required 83,000 sq. ft. of duck. The quality of the duck is extra, the raw material having been selected with the greatest care. Only a little more than half the duck, 43,000 sq. ft., went into the schooner's twenty-five great sails, the rest being used for sail covers and the awnings for the forecastle and poop decks, boat covers and the almost innumerable smaller needs of seafarers. Beside the big sails for the Lawson herself, there are sails for two of her three small boats, the third of which is a 30 ft. gasoline launch.

To make the ropes used in the edges of the seven-master's sails 3 tons of pure manila boltrope, made from long stock bought especially for this contract, and from long threads of hemp only, were used. The ropes are as big as an ordinary fishing schooner's cables.

The leach ropes are put on with 128 parts of twine, made of Sea island cotton, the whole being covered with duck. When the ropes were being worked they could not be spliced by hand, for no man had strength enough to draw the strands that must be woven together; so a "horse," such as is used in splicing ship's cables, was brought into service and the strands of hemp were drawn by means of its windlass. To hold such materials under the tremendous pressure that the wind will sometimes exert upon them unusually heavy accessories are naturally needed. The Lawson's sails are finished in a way that has never been used on any other schooner and is employed only on the largest square-riggers.

The thimbles are kept in by wire cringles, for example, instead of being sewed over and over with tarred rope, and the clew rings are probably the heaviest ever put into a suit of canvas. Eight thicknesses of heavy duck were put into the re-enforcements or clew patches at the corners of the sails. There is as much material and labor in the Lawson's duck suit as there would be in those of nine ordinary Gloucester fishermen. The set of colors presented to the Lawson is said to be the biggest outfit of bunting a sailing vessel ever had. Certainly its international code flags, twenty-seven in number and measuring seven ft. deep, are out of the ordinary.

Her American flag is 28 ft. long and her storm flag 16 ft. long. She has a 33-ft. burgee, a 14-ft. jack and a 50-ft. homeward bound flag—a long thin strip of striped bunting, called a pennant in the navy. There are two 12-ft. balloon pennants, as flagmakers call the hollow cones of bunting that are drawn to the masthead to point the direction of the wind, and five private flags which bear the name of the vessel, her special device, and the device of Capt. Crowley, her managing owner.

The Lawson's sails weigh 18 tons and fill 3,700 cu. ft. of space. Sixteen men were required to roll up the whole equipment. Tied up and ready for shipping, the mainsail alone stands as high as an average man's head.

#### FUEL OIL ON THE MARIPOSA.

The navy department has made public the report of Lieut. Ward Winchell, the expert detailed to investigate and report upon the efficiency and installation of the oil fuel system as fitted to the steamship Mariposa, owned by the Oceanic Steamship Co. of San Francisco. The report contains much information of value. The gross displacement of the Mariposa is 3,160 tons. The average horse power developed was about 2,481. The average distance made each day by the ship was 354 knots, giving a mean speed of 13.53 knots an hour. There were consumed each day about 278 bbls. of oil, which gave an average consumption of 3,720 lbs. per hour. It practically required 1½ lbs. of oil per hour to secure a horse power, and, while this result has been secured on shore in highly efficient engines, the consumption is practically 50 per cent. less in weight of combustible than would be required of coal. The ship required 262 hours to make the voyage from San Francisco to Tahiti, while only 260 hours was required to make the return trip.

By the use of oil as a fuel the complement of the ship was reduced from eighty-one to fifty-five, thus decreasing the force in the engine room from thirty-six to twenty men. The crude oil was atomized by means of an air compressor, which had a capacity of 1,000 cu. ft. of air per minute compressed to 30 lbs. The Mariposa has eighteen furnaces in her boilers, only twelve of which were used. Two burners were installed in each furnace, although all the burners were not in use except at short intervals when the engines were run at full power.

The engineer experts at the navy department are most interested in the fact that careful inspection does not show any effect of the flame on any part of the boilers. Upon reaching Tahiti, after the run, the tubes were swept by scrapers, and all the refuse collected barely filled two ash buckets and some of this came from the coal which had been used on one of the preliminary trials. The speed secured on the return trip was much higher than that attained on the trip to Tahiti, due to the fact that the firemen became better accustomed to manipulating the burners. The company had taken the precaution to arrange the burners so that steam could be used as the atomizing agent in case the compressor became impaired. On one or two instances during the voyage the compressor did need overhauling, and the oil was sprayed by steam while these repairs were being made. In discussing the class of men that should be employed in the firerooms, Lieut. Winchell says the work requires neither physical endurance nor previous training with coal fires. The men placed in charge of the contrivance, however, should have mechanical aptitude and possess readiness of resource and nerve.

#### CANADA AS A MARITIME NATION.

Canada stands eighth in point of ownership of vessel tonnage among the nations of the earth, leading Spain, Sweden, Holland, Denmark, Greece, Japan, Turkey and other countries. Britain heads the list with United States second then Germany, Norway, France, Italy, Russia and Canada. Following are the comparative figures.

	Total net tonnage.
British, including Canada and the colonies.....	10,304,338
American .....	2,318,876
German .....	2,106,885
Norwegian .....	1,393,096
French .....	961,250
Italian .....	947,079
Canadian .....	664,483
Russian .....	850,695
Spanish .....	561,668
Swedish .....	607,862
Dutch .....	451,940
Danish .....	387,727
Grecian .....	320,795
Japanese .....	510,175

These figures are given in the annual shipping report of the marine department of Canada, issued this week. The report shows that the total number of vessels remaining on the register books of the dominion on Dec. 31, 1901, including old and new vessels, sailing vessels, steamers and barges, was 6,792 measuring 664,483 tons register tonnage, being an increase of fifty-seven vessels and an increase of 4,949 tons register, as compared with 1900. The number of steamers on the registry books on the same date was 2,177, with a gross tonnage of 297,421 tons. Assuming the average value to be \$30 per ton, the value of the registered tonnage of Canada on Dec. 31 would be \$19,934,490. The number of new vessels built and registered in the dominion of Canada during the last year was 335, measuring 34,481 tons register tonnage. Estimating the value of the new tonnage at \$45 per ton it gives a total value of \$1,551,645 for new vessels.

#### THE VULCAN SHIP BUILDING CO., STETTIN.

The enormous progress made in recent years by the Germans is well exemplified by the successes achieved by the Vulcan Ship Building Co. of Stettin which lately built the Kaiser Wilhelm II. The remarks made by Mr. Wiegand, a director of the North German Lloyd on that occasion, are of great interest. He said:

"The tremendous weight of more than 11,000 tons, the greatest ever combined in any one vessel in any shipyard—a weight for the transportation of which more than 1,100 railroad cars would have to be set in motion—has to-day, and with the greatest ease I may say, left the resting place where art and knowledge joined it together to begin its mission of bringing nations closer together over the wide expanse of the ocean. With the building of this steamer the Vulcan company has attained a point of development that the human mind scarcely considered possible but a few years ago. Who realizes to-day, considering the enormous work of combining 20,000 tons register in one vessel, that the total tonnage of the merchant vessels built by the Vulcan company during its first thirty years of existence was 48,000 tons register distributed among 121 vessels? But it is in comparing the 40,000 H. P. of this new vessel with the 50,000 H. P. that was the sum total of the engine power of the 121 steamers constructed during the first thirty years that the enormous possibilities of the present day are more vividly brought to our notice. Here, in the yards of the Vulcan Ship Building Co., the first passenger steamers on a large scale were constructed, and it was in building these steamers that the Vulcan company gained the necessary knowledge and experience to undertake the building of the modern express steamers. After a period of time during the first half of the '90s, during which the results were but medium, that time of strenuous activity in German shipbuilding and mercantile circles set in that we may well regard as the master years."

## NAVAL MANEUVERS AND THEIR PURPOSE.

Of the naval manuevers planned for the present season those off the New England coast have already taken place; the greater manuevers off the West Indies are yet to come. The report of Rear Admiral Higginson, reviewing the navy's part, has just been filed with the navy department, but there is nothing in it to show whether he was satisfied with the manner in which the officers and men under his command conducted themselves and very little to indicate his opinion of the results of some of the actions. However, explanation is given of the objects aimed at. Two important purposes underlie the manuevers. These are:

First. Demonstration, for the benefit of Europe, of the ability of the United States to protect Boston and New York, the two cities upon which an enemy would probably primarily direct his operations, and Porto Rico, and the projected isthmian canal.

Second. Creation of enthusiasm for a larger navy among the people, and especially among their representatives in congress charged with the shaping of the naval appropriation bill. Since the war with Spain there has been no concealment by officials and officers of the navy of their belief that the next war of the United States is likely to be with Germany, and there are few in Washington who have forgotten Admiral Dewey's prediction, while returning to this country from Manila to the same effect. Nor have the authorities overlooked the fact that Emperor William forced his parliament to vote a naval program which by 1916 would add thirty-eight battleships, twenty large cruisers, forty-five small cruisers and sixteen divisions of torpedo boats to the navy then under the German flag, and that he subsequently obtained authority to complete this program by 1908. As the keynote of his argument for a larger fleet Emperor William declared that "Germany requires peace on the sea," and to attain this condition he insisted that the empire ought to have a navy so powerful that none would dispute with it.

Since the assumption by Mr. Roosevelt of the presidential chair there has been a decided change in the attitude of Germany toward the United States. While welcoming the friendly overtures of Emperor William, the president has adopted, with a single important change, the declaration of his majesty as the maxim this country should observe: "The United States requires peace on the sea." President Roosevelt proposes, therefore, that during his administration there shall be developed a highly efficient navy of sufficient strength to fully protect the United States and its possessions and the isthmian canal when that waterway is constructed.

"The American people must either build and maintain an adequate navy," he said in his last annual message, "or else make up their minds definitely to accept a secondary position in international affairs, not merely in political but in commercial matters. It has been well said that there is no surer way of courting national disaster than to be 'opulent, aggressive, and unarmed.'" Since that statement was penned there has been no change in the president's ideas with regard to the navy, and it is learned that in his forthcoming message he proposes to reiterate in equally vigorous language the need of more ships and more men. As an indication of the President's interest in naval affairs, it is learned that he recently directed a member of the general board to prepare for his information a statement of the naval strength of the United States as compared with that of European nations. This report will be the basis of the recommendations he will insert in his next message.

There is not an official of the administration who wants to fight Germany or any other nation; but they are firm believers in the axiom that the way to avert war is to be prepared for it and to show publicly that the preparation is adequate. When Prince Henry was in the United States, he was taken to Annapolis under escort of Hon. John D. Long, then secretary of the navy, and the bureau chiefs of the navy department. His highness expressed surprise that the government should spend \$8,000,000 in reconstructing the naval academy. "We would build two battleships with that sum," he told Secretary Long. "Yes," responded the secretary, "but then, you know, we have \$8,000,000 more with which to buy men-of-war." Returning from Annapolis the prince spoke of Rear Admiral Bowles, chief constructor, in regard to the coal supply of the American armorclads. "Our vessels can carry sufficient fuel," remarked Rear Admiral Bowles, "to proceed across the Atlantic and engage in offensive operations; in this respect, you see, they are superior to your German battleships." It is now known that in so clearly describing the resources of the United States and the better qualities of our men-of-war, the officials deliberately intended to impress the representative of the emperor with the actual and latent strength of the United States.

The manuevers just held and to be held aim to meet three separate problems—first, the discovery and defeat of an enemy's fleet which contemplates a descent upon the New England coast; second, an attack by an enemy's fleet upon the eastern defenses of Long Island sound and the establishment of a base which would enable it to paralyze the commerce of New York and Boston and to conduct operations at will against those two ports; and third, the mobilization of the North Atlantic, South Atlantic and European squadrons in the Caribbean sea. The design of the first problem was to show the inability of an enemy to reach our coast without being sighted by scouts and reported to the home squadron, and the arrival of the latter in time to prevent his establishment of a base on the coast. The purpose of the joint maneu-

vers was to prove that the fortifications of the coast are so well armed and manned that an enemy's fleet cannot pass them, or if it succeeds in running by will suffer such great damage that its annihilation will be a matter of comparative ease. The object of the combination of the three squadrons during the coming winter is to demonstrate by practical exercises that the United States can frustrate the attempts of an enemy to operate successfully against our West Indies possessions or the isthmian canal. As an indication of the value of these manuevers, officers of the navy point to the fact that before the war with Spain, the North Atlantic squadron, in co-operation with the naval war college, worked out problems which actually arose during hostilities. The manuevers were planned by the general board, of which Admiral Dewey is president, and the naval war college working in conjunction.

Of the attack on the defenses of Long Island sound at day-break of Sept. 2, Admiral Higginson in his report has this to say:

"The Brooklyn and the Massachusetts left the base (Block island) about 10 p. m., Sept. 1, to run through the Race, Gull Island passage, and take Fort Terry on Plum island in reverse. The battleships Kearsarge, Alabama and Indiana and the monitor Puritan got under way at 1:40 a. m., Sept. 2 and advanced to attack Fort Gardiner and Fort Terry from the south. Both fleets were in position by daylight. The fort on Gardiner's island was put out of action by points and a cross-fire established on Plum island. It was claimed from this action that Plum island was captured and the fort on Great Gull island by position, the fleet being in its rear, where none of its guns would bear."

The important action of Sept. 4, when the Brooklyn and Olympia went through the Race to divert the attention of the forts from the Battleships Kearsarge, Alabama and Massachusetts, which proceeded covertly about a mile behind, is thus explained:

"The Brooklyn and Olympia directed their fire to put out the searchlights (of the forts); also to draw the beams of the searchlights to them and allow the battleships to get as close as possible without being discovered. The night was very clear and not one that would be selected for such an undertaking, but the ruse was fairly successful and the battleships got within close range before they were discovered."

The attack by four divisions of the fleet on the Newport forts on the afternoon of Sept. 6 is explained by the admiral. One division attacked the army signal and observation station at Price's Neck. "The umpire," Admiral Higginson says, "allowed that this was put out of action, but the boat's crews sent ashore to capture the place were ruled out as captured or killed."

"The plan of attack," the admiral says, "was to anchor the Massachusetts, Indiana and Puritan off Ochre point and shell Forts Adams and Wetherell over the land, enfilading Wetherell and taking Fort Adams in reverse. The Brooklyn and Olympia attacked the signal station near Narragansett pier, which the umpire allowed was out of action after twenty minutes' shelling with the secondary batteries. The Kearsarge and Alabama bombarded Forts Adams and Wetherell by zigzagging in the dead angle of direct gun fire of Adams, Wetherell and Greble, the intention being to pass inside and to the eastward of Brenton's reef lightship before turning out. It was not considered advisable to risk the ships for the purpose of manuevers inside the lightship where uncharted rocks might be run upon."

The final action of the war game, that highly dramatic and spectacular night run past Forts Adams and Wetherell, defending the eastern channel of Newport harbor, is treated very briefly. Admiral Higginson says in explanation that the ships participating—the Brooklyn, the Olympia, the Kearsarge, the Alabama and the Massachusetts—were formed in that order "to run the batteries." They found no difficulty, he says, in navigating, "in spite of the glare of seven or eight searchlights directed upon them at once." The guns were not fired, except by the rear vessels, he adds, as the smoke might have caused a serious accident.

The Caribbean sea has been an important scene of war since other nations began to contest Spain's supremacy in the western hemisphere. The transfer of the Spanish and Danish islands to the United States and the construction of the isthmian canal are destined to make it now more than ever a field of battle for this country. Destruction of the Spanish fleets at Manila and Santiago resulted in the loss by Spain of her colonies in the Indies, which with the exception of Cuba passed into our possession. Loss by the United States of control of the sea in a future war will cause it to suffer the humiliation of surrendering these islands to the victor. But of greater importance, it would result in the destruction or seizure of the Panama canal and consequent damage to the American commerce which that waterway will promote.

So, if the Monroe doctrine is to be enforced and the United States is to maintain its sovereignty over the Caribbean islands and its rights in the projected isthmian canal, it must be prepared to make efficient defence against a foe. Just before the outbreak of the war with Spain the United States had squadrons stationed in South Atlantic and European waters. Instructions were sent them to return home, the South Atlantic squadron to report at Key West and the European squadron to make for different points. In the manuevers to be held during the winter the central idea will be to mobilize a force which will be able to act as a unit in repelling an enemy bent upon destroying American power in the Caribbean sea. When finally assembled the fleet

will be the most formidable ever collected under the American flag. To insure destruction of the Spanish division commanded by Admiral Cervera, Sampson gathered before Santiago five battleships, two armored cruisers and a number of protected cruisers, gunboats and torpedo boats. Under the command of Admiral Dewey, there will be mobilized in the vicinity of Porto Rico, in December, eight battleships, one armored cruiser, a dozen protected cruisers and gunboats and two flotillas of torpedo boats. The problems which will be solved are now being discussed by the general board. Generally it is known that in the preliminary maneuvers the European squadron will represent an enemy under orders to establish a base on the shores of Porto Rico or Culebra island, and the North Atlantic and South Atlantic forces must effect a junction, discover his location and meet him with a superior fleet before he establishes his base. Porto Rico and the island of St. Thomas are regarded by naval officers as the gateways of the Caribbean sea. It is hardly likely that an enemy, however, would care to make a dash toward Cuba or the mouth of the isthmian canal leaving behind him an active force to threaten his communications. So a thorough knowledge of naval conditions in the vicinity of Porto Rico and St. Thomas and the naval base at Culebra are of the utmost importance.

Fleet maneuvers are essential if the navy is to be prepared for war; but they are costly and the president and Secretary Moody have been considering the way in which to obtain additional money, not only to defray their expense, but for target practice and other crying needs of the navy. To settle bills arising out of the maneuvers of the fleet, an estimate was submitted to congress for an appropriation of \$120,000, but when Secretary Moody appeared before the committee charged with consideration of the matter he opposed it on the ground that whatever expense there was should be borne out of current appropriations. If these appropriations were not large enough then they should be increased. Naval officers say it is just as well that Mr. Moody's views prevailed, for now there will be no outcry if the navy should expend a moderate sum for drill purposes. In gunnery, particularly, the navy desires to be proficient, and this is also the wish of the president. "Above all," Mr. Roosevelt declares, "gunnery practice should be unceasing. It is important to have our navy of adequate size, but it is even more important that ship for ship it should equal in efficiency any navy in the world." The present allowance for target practice is small. As an instance of its inadequacy the annual naval appropriation act has contained for some years a provision to this effect:

"Gunnery exercise—Prizes for excellence in gunnery exercises and target practice; diagrams and reports of target practice for the establishment and maintenance of targets and ranges; for hiring established ranges, and for transportation to and from ranges, \$12,000."

The navy has repeatedly complained that this appropriation is entirely too small for the proper carrying out of the objects named in the provision, but congress has remained deaf to its representation. As a result, the navy department found it necessary to abandon the award of prizes for proficiency in marksmanship. The president is a firm believer in prizes. He thinks it stimulates the men to better work, and by his direction the department is preparing a general order to the service announcing the re-establishment of gunnery prizes.

Gratification is expressed in naval circles that the president and Secretary Moody have adopted the policy of permitting congressmen to see what the navy is and to find out that the naval officer has more to do than simply to sit on deck and twirl his thumbs. There is a great deal of ignorance at the capitol regarding the service, and if this be swept aside and intelligent discussion of naval affairs occur the people of the country will become educated and greater liberality will be shown to the fleet. Unless the importance of maneuvers and target practice be understood by the country, there is danger of an attempt to limit the sum that shall be spent for these purposes. "Even in time of peace," to quote President Roosevelt again, "a warship should be used until it wears out, for only so can it be kept fit to respond to any emergency."

#### **AN ANALYSIS OF THE CANADIAN FAST LINE.**

The newspapers are full these days of the Canadian fast line project. It is easy to write about it but quite another matter to establish it. Reduced to analysis it presents many serious obstacles and it is difficult to see how they may be overcome, even by subsidy. The first question which presents itself is that of the terminal port. The St. Lawrence river advocates desire to establish it at either Quebec or Montreal, oblivious to the fact that the route defeats itself owing to its dangers. It is foolish as well as useless to ignore them because they are positive and constant. It would be impossible to run a fast line from Montreal or Quebec. The ocean liners which now run from there have to slow down for hours and even days and feel their way along the channel. An absolute schedule is impossible. The same conditions which confront the present liners will confront the proposed fast line, because they are physical conditions. The St. Lawrence river route must be dismissed altogether. Now about Sydney or Halifax. They are nearer the leading British ports than any other American port and they are blessed with deep water practically to the docks. This is their great advantage. What are the disadvantages? It is estimated that the

cost of running a fast steamer line weekly between New York and Liverpool is \$7,850,000 per annum. The subsidy offered the Canadian line is approximately \$1,000,000, or about one-seventh of the cost. The real support of the line must come from passengers and freight. Is it possible that Halifax or Sydney could secure sufficient of both? The district which would have to support this line includes Montreal, Ontario and the west. In the case of the citizens of Montreal and Quebec they could take a steamer at the end of a street car ride. It is reasonable to suppose that they would prefer a railway ride extending into the second day to get to Halifax or Sydney in order to take a steamer that was a bit faster? In the case of the citizens of Ontario they could reach New York in ten or twelve hours and Montreal in two or three. Is it likely that they would endure a fatiguing journey to get to Halifax? Then with freight. Are the merchants and manufacturers of Montreal, Quebec and St. Lawrence river ports going to send freight to Halifax when they can ship it on a vessel within sight of their factories? It is difficult to perceive where the money is coming from to support the Canadian fast line. The venture must be commercially sound otherwise it cannot succeed. It cannot be maintained by subsidy.

#### **INVESTIGATING STORAGE BATTERIES.**

The board of construction of the navy department has under consideration the advisability of conducting a number of experiments which will be of considerable importance, not only to the navy department itself but to the electrical world at large and which may result in the addition of considerable information to the general knowledge of storage batteries. Some weeks ago a board of inquiry investigated an accident which occurred on the submarine torpedo boat Holland and reported that the preponderance of evidence went to show the explosion was due to the ignition of hydrogen gas given off by the storage battery, the cells of which were found to be in a generally deteriorated condition. The board recommended to the board of construction that a series of experiments be conducted especially with reference to the composition of gases given off by storage batteries, the conditions under which these gases are given off and to their explosive or non-explosive character. The report also suggested that experiments should be conducted with cells in various stages of deterioration. The board of construction is considering the advisability of having a number of such experiments made and it is believed that it will decide upon an inquiry on these lines. In discussing this question Com'dr. Charles G. Badger, who was president of the board of inquiry said:

"The literature on storage batteries is very limited and scarcely anything is shown of the effect of the deterioration of the cells and I consider such experiments as those recommended by the board of inquiry will result in the acquiring of information of great value both to the department and to electricians. The preponderance of testimony before the board was to the effect that the explosion was due to gas generated by the batteries, and what we want to know is when a battery begins to deteriorate, and how much danger there is from its deterioration. It is my idea that such experiments could be conducted by a chemist who would begin with a perfectly new battery, and then by replacing the good plates with others which had been worn from time to time, they could in the end have a completely worn out battery. In the meanwhile they could watch the charging of the battery, the amount of gas thrown off in each stage of the experiment, the combustibility of the gas, and the danger of ignition from sparks from switches, and the force of the explosion of such gases. Some of the officers of the navy believe the submarine boat of the future will be operated by storage battery power. This is important to the navy in connection with the development of this type of fighting vessels, for it is very necessary for us to know how long our batteries are to last and their comparative value from the time of installation until they become worthless. We should also know the liability of danger from them and the best means of guarding against it. The batteries in the Holland were installed six years ago, and had substantially no repairs during the past four years. They were in very bad shape."

Lieut. Caldwell, commanding the Holland, attributed the deterioration of the batteries to wear in long and irregular service.

"The conditions of service have been such," he said, "that the battery was used very irregularly, frequently charging and discharging twice a day and frequently going for weeks without discharging. As these batteries are probably the most expensive part of the equipment of submarine boats, I think it is a matter on which the navy department should have the fullest information possible."

#### **BRANCH OFFICES OF THE MARINE REVIEW.**

The Marine Review Pub. Co. has established a branch office for the care of eastern business at No. 1023 Maritime building, New York City. The office is in charge of Mr. George Wood Ramage, who has represented this company in the east for some time past. Mr. Ramage will give attention to a large part of the eastern correspondence, as well as advertising and other business matters. A branch office for the care of western business, established several weeks ago in Chicago, is at No. 373 Dearborn street and is in charge of Mr. C. E. Walker, who has represented the company in Chicago for several years past.

# NEWS OF THE



# GREAT LAKES

## SHIPS TO COST MORE THAN EIGHT MILLIONS.

**They will carry 3,000,000 gross tons in a lake season—all berths of American Ship Building Co. engaged until October of next year.**

Orders for eight steel freight steamers of the largest type were added within the past two or three days to the long list which the American Ship Building Co. (consolidated lake yards) has on its books for next year's delivery. Six of the vessels are for J. C. Gilchrist of Cleveland, and one each for G. A. Tomlinson of Duluth, and John J. McWilliams of Buffalo. Orders which the American company now has in hand number thirty-five, and only one of the vessels, the steamer Muncie, building at the Detroit works for the Anchor Line of Buffalo, and to be launched Saturday of this week, is to be delivered this year. The vessels just ordered by Messrs. Tomlinson and McWilliams are not to be delivered until July next. One of the six Gilchrist vessels will also be delivered in July of next year, but the last of them is not to be finished until Oct. 1. In speaking of the Gilchrist vessels Vice President Ireland of the ship building company gave it as his opinion that he would have to obtain the steel for their construction from abroad, owing to conditions which appear to make it impossible for American manufacturers to deliver it in good season.

The aggregate value of the thirty-five vessels is about \$8,280,000. As all but one, a car ferry, will engage in the bulk cargo trade, their combined capacity will be very large. They will carry on a single trip 160,250 gross tons, so that if allowed twenty cargoes for a season they would move an aggregate of a little more than 3,200,000 gross tons.

The six Gilchrist steamers are to be duplicates, measuring 436 ft. over all, 416 ft. keel, 50 ft. beam and 28 ft. depth. Their capacity is estimated at 6,500 gross tons each. Their triple-expansion engines will have cylinders of 22, 35 and 58 in. diameter with a common stroke of 40 in. They will each have two Scotch boilers of 13 ft. 2 in. by 11 ft. 6 in. All of them are to have Ellis & Eaves draft.

Zenith Steamship Co. is the name of the corporation that Mr. Tomlinson of Duluth represents in the order he has just placed. Mr. Tomlinson will have the management of five large steel steamers when this one is completed. Her dimensions are: Length of keel, 416 ft.; beam, 50 ft.; depth, 28 ft. She will have triple-expansion engines and Scotch boilers. She will have twelve hatches with the customary 24-ft. centers, but her interior construction will be so arranged as to lessen possible interference with the parts of the automatic machines for unloading iron ore. This arrangement is upon the design of Capt. Joseph Kidd of Duluth. She will be built at the old Globe yard, Cleveland.

The steamer ordered by John J. McWilliams of Buffalo, is for the Eldorado Steamship Co., of which Mr. McWilliams is president, and Mr. J. E. Ball, also of Buffalo, treasurer and manager. This vessel will be a duplicate of the Cleveland steamer W. C. Richardson. She will be 374 ft. over all, 354 ft. keel, 48 ft. beam and 28 ft. deep. She will have triple-expansion engines with cylinders of 20, 33½ and 55 in. diameter and 40 in. stroke, supplied with steam from two Scotch boilers, 14 ft. in diameter and 12 ft. long, allowed 170-lbs. pressure. She will be built at the South Chicago yard.

The steamer Moses Taylor, building at the Lorain works for Capt. John Mitchell of Cleveland, will be launched on Saturday.

## COMMERCE OF THE GREAT LAKES.

In 1900 the treasury bureau of statistics undertook to effect a measure of the port to port commerce of the great lakes and it has from time to time been issuing statements upon the subject. As is well known there is no real measure of lake commerce, except that which is kept by the United States authorities at the Sault Ste. Marie canal, and that, of course, measures only the Lake Superior traffic. However the Lake Superior traffic is undoubtedly far more than half the traffic of the entire chain of lakes and upon that basis one may at least approximate the total. The bureau of statistics endeavors to work through the masters of vessels by having them send to the bureau a duplicate manifest. It is from these manifests that it compiles its statistics. Unfortunately the bureau has no power to compel the master of the vessel to furnish this information and it is doubtless true that a great many of them do not furnish it. Unquestionably the passenger lines do not. It is to be regretted that the bureau has not the

force of law behind it. If it were made compulsory, instead of optional, to supply this information we should have thoroughly reliable statistics. However, we ought to be thankful for what we do have; but the point is that it is not and cannot be a thorough measure of commerce until congress takes a hand in it by enacting the necessary statute to require this information. The bulletin of the treasury bureau follows:

"The phenomenal activity of the whole country is illustrated by some figures, just prepared by the treasury bureau of statistics, showing the commerce of the great lakes during the month of July and the seven months ending with July. The chain of great lakes, which stretches from New York at the east to Minnesota at the west, transports a large proportion of the products of a dozen states in which are included the principal agricultural mining and forestry sections of the country. The measurement of the commerce of the lakes, therefore, is an important exponent of the business activities of the country. Figures of the treasury bureau of statistics show that the total freight receipts at 144 receiving ports on the lakes were 25,718,826 net tons in the first seven months of the year, compared with 18,891,257 net tons in corresponding months of last year. The statistical measurement of trade on the great lakes has been greatly developed by the bureau of statistics within the past few years. Under the system of reporting cargo by masters of vessels, which it established in the year 1900, an average of from 7,500 to 8,000 supplementary manifests is received at the bureau each month during the season. These manifests are immediately tabulated in such a manner as to show the amount of business done by each lake port throughout the month and year. July is the latest month for which figures have been published in the summary of internal commerce, 144 receiving ports and 217 shipping ports being represented. The end of July usually marks the turning point in the open season of lake navigation. This year, however, an earlier opening brought out a much heavier tonnage movement than last season. The total freight receipts for the first seven months of this year were 25,718,826 net tons, as against 18,891,257 net tons to the corresponding date last season. This increase is at the rate of 30.6 per cent. over the received tonnage last season. Shipments thus far this season have amounted to 26,876,006 net tons, those of last season being 19,653,334 net tons. The most conspicuous gains have been made in the shipment of ore and minerals not including coal, this season's total amounting to 13,377,912 gross tons, against only 9,083,982 gross tons in 1901—a gain of 47.3 per cent. Coal shipments increased from 3,670,871 net tons last season to 4,652,323 net tons this season. Slightly less than half of the total freight tonnage on the lakes consists of iron ore.

"The movement of registered tonnage of vessels on these inland waters is reported for the first time this year. In these reports of internal commerce only the vessel movement between American ports is included. In seven months 37,413 vessels arrived with a tonnage of 35,087,876 tons registry, and 37,798 vessels cleared of 35,786,701 tons registry. This is more than twice the registered tonnage of both foreign and American vessels engaged in the foreign trade of the country for the same period of time. The foreign trade engaged 2,174,954 tons of sail, and 14,094,967 tons of steamships of all nationalities to July 31, 1902, making a total of 16,269,921 tons. The combined registered tonnage in the foreign trade at New York, Boston, Philadelphia, Baltimore, New Orleans, San Francisco and Puget Sound for the entire year 1901 was 18,868,808 tons entered, and 18,487,246 tons cleared, or somewhat more than half the total tonnage reported for the great lakes during the seven months of 1902.

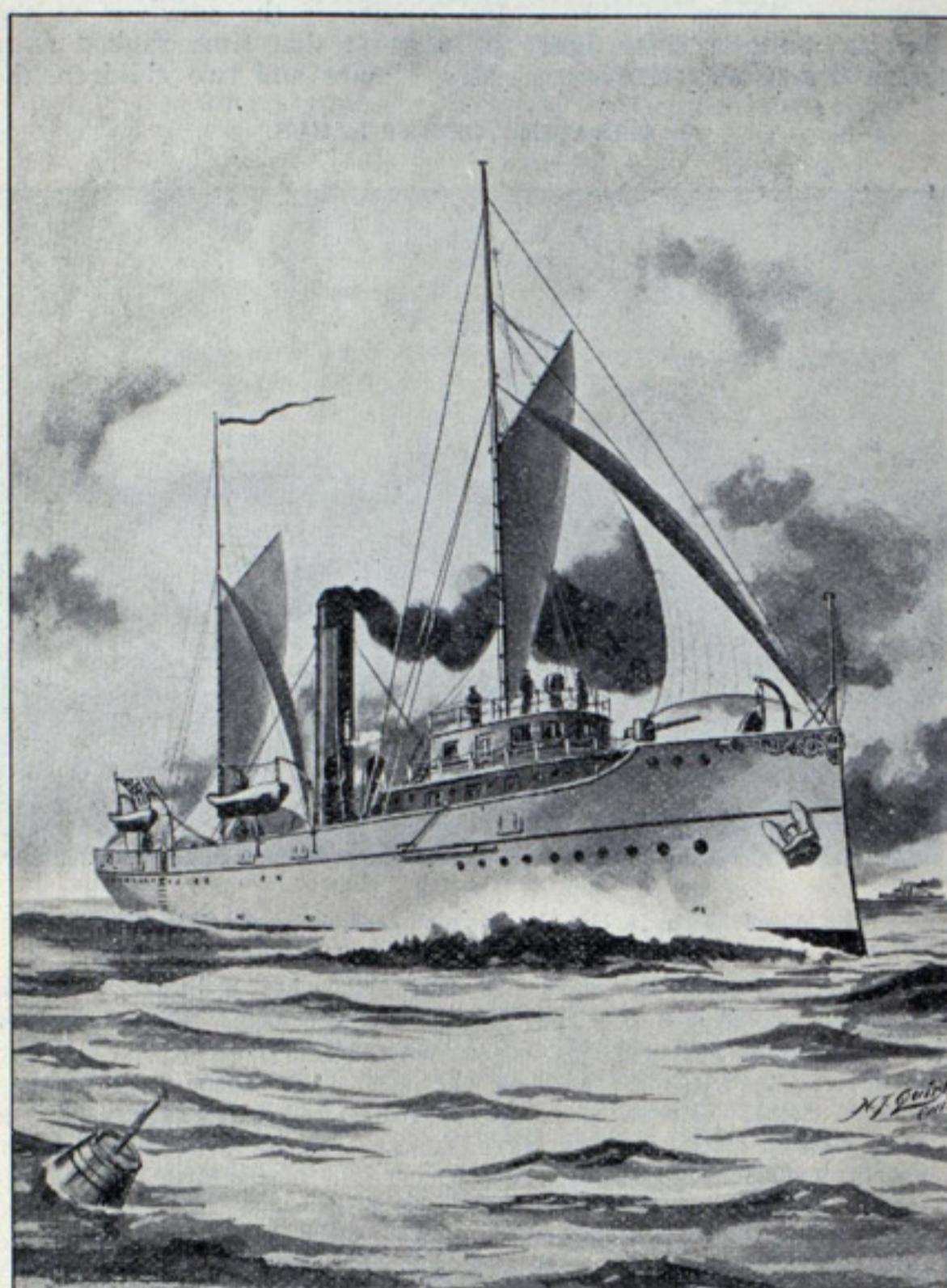
Further analysis of this enormous total shows that fourteen ports each report arrivals and clearances of 1,000,000 tons and over. Five ports, Chicago, Milwaukee, Duluth, Cleveland, and Buffalo—each show clearances of 2,000,000 tons and over. The combined arrivals at these five ports was 11,421,099 tons, and the clearances 11,455,544 tons."

The firm of L. P. & J. A. Smith of Cleveland are now engaged in constructing a canal through the property of the Lackawanna Iron & Steel Co. at Buffalo. The canal will be 250 ft. wide, 25 ft. deep and will be approximately a mile long. It will be of concrete construction. The purpose of the canal is to permit vessels to unload directly at the stockpiles of the furnaces and thus save the extra handling of ore. The ore will be discharged underneath an elaborate equipment of hoisting and conveying machines which will automatically carry it to the furnaces. The canal, extending from deep water, will virtually give the steel company a dock frontage of 2 miles. The work is to be finished by next September.

## REVENUE CUTTER TUSCARORA.

Capt. John W. Collins, engineer-in-chief of the revenue cutter service, writing to the Review regarding the trial trip of the revenue cutter Tuscarora which is to come to the great lakes, says:

"The Tuscarora's trial underway was held in Hampton Roads and Chesapeake bay. The machinery was run at full speed for a period of six hours, and the average revolutions of the engine for that time was 180. Owing to the prevailing coal strikes it was impossible to get any but a very inferior grade of coal at Richmond upon which to make the trial trip. In addition to that the



The Revenue Cutter Tuscarora.

[From a copyrighted drawing by Nicholas J. Quirk.

vessel's bottom was very foul. Notwithstanding these drawbacks she made a speed of 14.3 knots (.3 knot in excess of the requirements) over a known distance between lighthouses. The machinery although designed for only 1,200 H. P. with natural draft, developed an indicated horse power of 1,416. There was no heating of bearings and all parts of the machinery including windlass, steering engine, etc., performed very well indeed under maximum tests. It has not been decided when she will be taken to her station on the great lakes. She is now at the yards of her builders receiving a few finishing touches and will probably be ready to leave there within three weeks."

## THE SAULT LOCK QUESTION.

No doubt there is considerable truth in statements published in several Michigan newspapers recently, to the effect that plans for the large Poe lock at Sault Ste. Marie did not contemplate the influence on water levels of channel improvements since made below the locks, and that as a result there is not the depth of water in the big lock that was expected. As there are several places in the connecting waterways of the lakes where channels are shallower than the depth of water prevailing this season in the Sault lock, no hindrance to deep-draught vessels has occurred on account of the blunder, mistake, or whatever it may be called, in the plans of the Poe lock. It is a serious matter but evidently not one that can not be remedied in time to give later on to vessels passing the Sault all the depth of water that they can get in other parts of the rivers when dredging now under way is completed. No doubt the vessel interests will shortly take the matter up with the government and secure funds with which to lower the floor of the lock and make other suitable changes if such are needed in advance of the construction of another lock, which is even now a necessity. It would seem, therefore, that there is nothing to be gained in discussing in the meantime the question of a possible mistake in designs of

the Poe lock. What is wanted now is attention on the part of the vessel interests to the needs of commerce at the Sault; prompt attention, so that the changes will be made very soon if they are needed in advance of the construction of another lock. Major Bixby, the engineer now in charge of the large works at the Sault, says in reference to the criticism of the Poe lock.

"When the Poe lock was designed and its sills constructed it had a clear height of 22.33 ft. of water over its lower sills at the average water level of the preceding twenty years. This height was 1.33 ft. better than was required by the act of congress which provided for its construction. Even at the exceptionally low water stages of this year there was not an hour during August when there was less than 19.6 ft. on the Poe lock sills. Gen. Poe was far ahead of his time and generation when he planned and urged the construction of this lock, and he planned with great wisdom and care. In 1886, when the lock was originally proposed, the total freight carried through the Sault canals was only 4,500,000 tons for the year, and all canals were small in comparison with those of today. He urged the necessity of providing for a great increase in this commerce of the great lakes, and found great difficulty in persuading congress that the expenditure for such a large lock would be justified. Last year the total freight carried through these locks was 28,000,000 tons, and this year it will be 35,000,000, nearly eight times that of 1885, and the vessels themselves have greatly increased in all their dimensions, like their tonnage.

"The great increase in size of vessels and the natural demand of the Lake Carriers for more width and depth and straighter channels through St. Mary's river from the Sault to Lake Huron made necessary the fine Hay lake channel, which is a very great improvement upon what existed before, and for which the engineer corps should be praised rather than blamed. The opening of this new and improved channel through Hay lake has had its natural effect in somewhat lowering the water surface below the Poe and Weitzel locks, therefore somewhat lessening the draught that can be carried through them today. Gen. Poe can in no way be justly charged with having blundered because of such improvements which are subsequent to his time and life, and it will be very easy for the United States engineer corps to lower the sills of the present locks or to build additional locks whenever congress provides necessary funds therefor, such work being illegal until actually authorized by congress and funds for the same actually appropriated."

## DULUTH GRAIN SITUATION.

Duluth, Minn., Sept. 17.—We are only now (Tuesday and Wednesday of this week) beginning to receive the grain that has been expected here for at least three weeks past. On Saturday last there was less than three-quarters of a million of merchantable wheat in store. The receipts of wheat from Aug. 1 to date have been approximately 2,000,000 bu., as against 6,000,000 bu. in the same period a year ago. The grain was nearly a month late in coming here, mainly on account of inclement weather. A fair start has now been made, however, and an enormous flood of wheat and flax is expected during the next sixty days. Under the lagging conditions that have prevailed up to this time, the lake freight rate has been nominally 2 cents for wheat to Buffalo. Activity in freights is, of course, expected with the change to a larger movement of grain.

Officials of the Canadian Northern road, now completed through from Port Arthur, Lake Superior, to the Manitoban grain fields, expect to move 15,000,000 bu. of wheat from the northwest to Lake Superior on this crop. A 2,000,000-bu. tile tank storage is now being put up and should be ready to receive wheat some time in January. The 1,200,000-bu. wood working house is being overhauled and should have no difficulty in working well up to capacity, though there has been trouble with it ever since its completion last year. The Canadian Pacific will handle the bulk of the grain crop of the Canadian northwest, and will move a great volume of wheat and flax to Fort William, its lake terminal. It is not well provided with elevator and shipping capacity, and it will not be surprising if considerable Manitoba wheat shall get to the lake via Duluth. The Canadian Pacific is rebuilding the steel house recently destroyed by fire and is erecting additional capacity in large amounts, but neither will be ready this year.

Major Clinton B. Sears of the army engineer corps, who was transferred from the charge of Lake Superior harbors to important duties in the Philippines about eighteen months ago, is quite anxious to return to this country. He was very much pleased with the islands at first, but in common with most Americans finds the enervating influences of the climate too much for the active American spirit.

Wieland Bros., who have the sunken steamer Thomas Wilson on their hands, have not yet begun actual work in the field preparatory to moving the wreck. They say they will do so in a week or two.

The Duluth-Superior Milling Co. has just added 2,000 bbls. to its daily flour production in the Listuan mill that has been idle three years. The company is now making 8,000 bbls. of flour daily, ranking it well up in the first half dozen concerns of the United States.

## AROUND THE GREAT LAKES

Attorney Ray G. McDonald of Chicago (New York Life building) has recently been appointed a member of the faculty of the John Marshall Law School of that city. He will give instructions in his specialties, marine law and insurance law.

It is understood that the Chicago, Milwaukee & St. Paul railway is considering the necessity of building another ore dock at Escanaba. Nothing definite has been announced regarding the subject but it is known that the St. Paul considers its facilities at that port insufficient.

In the case of the collision between the steamer Wolf and the tug Alpha, outside Buffalo breakwater, on Aug. 26, both captains are held culpably negligent by the steamboat inspectors and the licenses of both were suspended for fifteen days. The masters affected are William Lund and George S. Tripp.

Osborn & Co., Duluth, Minn., report that their sand sucker tug Corona, fitted out with an 8-in. rotary pump and using an Osborn patent scow, unloaded 157 yds. of material in forty-five minutes recently. The scow was loaded, towed about 13 miles and unloaded in four hours. The total crew is six men, one of whom is a cook. Osborn & Co. believe this to be a record.

Major W. L. Fisk, engineer in charge of the United States lake survey, whose headquarters are at Detroit, announces that a new shoal has been discovered in the Apostle islands, Lake Superior, with a least depth of 20 ft. at the present stage of the lake. The shoal lies 1,600 yards north  $24^{\circ} 40'$  true from the most northerly point of Oak island, a location that makes it dangerous for a considerable amount of shipping.

The Canadian gas buoy at Bar Point, which was recently cast adrift and the anchor lost, has been replaced. Capt. George P. McKay, chairman of the committee on aids to navigation, says that this buoy gives more trouble than all the other aids. It is being continually run over by vessels. The Canadian government now declares that it will not be replaced again unless the vessel which hits it pays the damage. The buoy is placed there to mark the channel and not as some of the vessel men appear to think, as a target.

Nothing whatever has been seen of the wreck of the burned steamer W. H. Stevens, notwithstanding the fact that it has been located on two or three occasions by the newspapers. Mr. E. Parry Jones, who represents the salvage branch of Lloyd's on the lakes, is confident that the wreck will never be located as he believes it has sunk in deep water. The steamer's value is given as \$30,000, though the insurance upon it is \$45,000. She contained an unusually valuable cargo of copper and flax. The cargo was of far greater value than the steamer.

Judge Swan of Detroit has appointed William Morris and Walter H. Oades of Detroit, appraisers to estimate the value of interest held by William C. Jenks of Port Huron, Sarah L. Schnoor of New Baltimore, Michael Madden and William E. Donely of Saginaw, in the steamer Lloyd S. Porter which was in collision with the steamer Turret Age while en route to the Atlantic coast two years ago. As a result of the collision the Porter sank in 24 ft. of water near the village of St. Croix in the gulf of St. Lawrence. At the time of the collision the Porter had been leased by the above petitioners to the Manhattan Steamship Co. of New Jersey. An action was brought by the lessees against the owners of the Turret Age in the superior court of Quebec and a verdict against her obtained, but on an appeal being taken to the privy council of Canada the decision was reversed and damages decreed against the Porter and in favor of the Turret Age. The petitioners claim that they were not the owners of the steamer at the time of the collision and ask that they may be decreed to be entitled to the benefits of the acts of congress of June 6, 1884, entitled, "an act to remove certain burdens from the American marine and encourage the American foreign carrying trade."

President Daniel J. Keefe of the International Longshoremen's Marine & Transport Workers' Association is a thorough believer in organization and arbitration. Mr. Keefe says: "Our hard work here on the lakes is practically over for the season. Our association is expanding very rapidly, and it seems to be for the good of all concerned. The splendid condition of affairs on the inland lakes will permit us to take up much unfinished business elsewhere that has been pressing the association's attention for some time. The north Pacific coast will be investigated first, as that particular section affords excellent opportunity for organizing marine craft. I shall leave for Vancouver, B. C., about Oct. 1, and will attend the convention of the association to be held at Portland, Ore., Oct. 10. It is planned to handle the entire coast union, which consists of some 25,000 members, from that place. The next important meetings of the association with the employing interests on the great lakes do not occur until after the present year ends. All contracts then expire. The first of these will be held at Superior, Wis., early in January, when the card for Lake Superior lumber loading will be fixed for the year of 1903. A little later another conference will be held at Manistee, Mich., for the purpose of fixing a similar wage scale for Lakes Michigan and Huron. On Feb. 1 a new contract for the ensuing year will be drawn up between the men and the Great Lakes Towing Co. The last, but among the most important, is the

conference with the dock managers, which should take place the first Monday in March."

The two-masted schooner Experiment, which capsized off St. Joseph last Friday night, has had an interesting history. She is now lying on the beach, practically a complete wreck. The Experiment has sailed the lakes for sixty years and has had many encounters with the elements. Fifty-four years ago the Experiment went ashore at almost the same place of her last wreck. On that occasion two of her passengers went through a thrilling experience, and one of them, now past eighty years of age, still relates the story of the wreck. The Experiment was at that time sailed by Capt. Nelson W. Napier, who went down with the schooner Alpena in 1880. Mrs. Napier is the survivor of the wreck, and the chief figure in what at that time ranked as a most disastrous occurrence. Mrs. Napier and two children, the

## A TRAGEDY OF THE LAKES.



The Wreck of the H. Houghton which sank at her Dock in Detroit.

elder a boy thirteen years old and the other a babe of a few months, accompanied Capt. Napier on the fatal trip. Entering St. Joseph in a storm, the vessel was rolled over in the sea and went ashore with her keel in the air. One sailor was washed ashore dead. Others were never found. All occupants of the boat except Capt. Napier were believed to be drowned. When morning came a wrecking crew succeeded in reaching the Experiment, partly buried in the sand and with water all around and under her. No one believed that any living thing could be found around the old hull, but to make sure axes were brought into play and a hole cut through the ship's bottom. There in the hold was found the mother and son, the latter holding his unconscious parent above the water. The baby had been washed from the mother's arms, and its body was found weeks later in the sands along the shore.

## DEVELOPMENT OF WATER POWER.

The United States geological survey, in its investigation of the water resources of the country, has been making recent studies of the water powers and water resources of the central western states. Great interest has been shown in the development of water power upon the streams in these states. Many years ago a number of large powers were there developed, and manufacturing cities of considerable size have since grown up about them. The great power on the Mississippi at Minneapolis is one of the best examples, being utilized for flour mills, the generation of electricity, and for various kinds of manufacturing. There yet remain a number of falls which may be utilized on the Wisconsin river, on the Mississippi river and its tributaries above St. Paul on the Forks river in Wisconsin, and on several of the larger streams of Michigan. The value to a community of such a natural source can not be over estimated. Within the last few days the great development at Sault Ste. Marie has been completed and water turned into a canal. Duluth is also looking forward to the utilization of part of the water power upon the St. Louis river, where the plans now completed show a fall of over 700 ft. and a power reaching a capacity of 100,000 H. P. This would make Duluth not only a great shipping point but probably the center of flour milling and other forms of manufacturing which require large amounts of power. The wheat from Minnesota and Dakota would be stopped at Duluth long enough to be ground into flour and then forwarded to the east by way of the great lakes.

Excepting for the large power at Minneapolis the market is greater than the supply, and plans are now in contemplation looking to the development of electricity upon the St. Clair river in Minnesota, to be used for electric lighting and electric car service. There are many other points in this region where power is now being wasted, but with the concentration of capital the larger power possibilities are being developed to the great benefit of the northern central states.

# HISTORY AND ROMANCE OF THE LAKES.

Under this general head the Review proposes to relate, as occasion may prompt, stories and incidents associated with the history of the great lakes. The present one, which describes a trip to Sault Ste. Marie in the early days, is contributed by Mr William Vessey, No 244 Clinton street, Cleveland. Contributions to this department are solicited.

## A TRIP TO SAULT STE. MARIE IN 1849.

In the year 1849, after spending the winter teaching in a school 7 miles east of London in Canada, at a salary of \$18 per month and boarding among the farmers, I concluded that shore life did not suit me. I had previously served six years on an English merchant vessel. So in the latter end of May, with a rifle on my shoulder and some money in my pocket, I started on my tramp to Sarnia—and a tramp it was, to be sure. The roads were mud and water, the country sparsely settled, and many times I was hungry, with no bed to lie on. Being full of energy and used to hardship, I covered the distance. At that time Sarnia was a small place and Port Huron not much larger. No one lived at Point Edward. It was just a sand beach. A little earth-work with a company of soldiers and one or two small brass cannon was the sum total of Fort Gratiot. The ferry between Sarnia and Port Huron was built of two hulls (canoes may be) with a deck athwartship connecting the two. Between the hulls was a paddle wheel. This wheel was propelled by four horses. They walked round and round, hitched to the arms of an old thrashing machine. The only tug on the rivers was the Gore. At one of the wharves in Sarnia was a schooner named the Agnes Ann, laden with 300 tons of all kinds of supplies consigned to the Hudson Bay company's post at the Canadian Sault. She was commanded by Capt. James Duncan. I signed articles at \$18 per month as an able seaman. One who could hand, reef, steer, knot and splice. The crew were the captain, mate, two seamen and cook. In the afternoon a breeze sprang up from the south'ard and with every inch of canvas spread we left the wharf. There was a goodby crowd of people to start us off with a cheer, for Sault Ste. Marie was then a distant and difficult place to reach with a sailing vessel. The wind died away when we were opposite where the Pt. Edward passenger depot now stands. We let go our anchor and lowered our fly for a tug, and just as the gun was fired, and the American flag came down at Fort Gratiot our tug was alongside. This tug was two span of horses driven by a little Frenchman. All small vessels running through the St. Clair river carried a long spare line to be used as a tow line for horses to tow them out of the rapids. We were towed for about two miles along the Canadian shore. The tug bill of \$5 was paid, and with a light southeast wind we were soon out of the current and on our way along the shore of Michigan. No steamboat signaled whistles to denote which side of the track they would take. It seemed as if we were alone, so silent was everything around us. With a fine breeze aloft and the surface of the lake smooth as glass, we made good headway. In the afternoon, during the first dog watch, we saw something like the limb of a tree with two smaller limbs upon it floating in the water. Looking at it through a telescope, we found that it moved. We lowered the yawl and soon had a buck deer aboard, pretty well exhausted, so we had venison on the table.

We passed Pt. au Barques the next afternoon with the wind blowing stiff from the eastward and the weather somewhat foggy. We only passed three schooners from the river up and no steam-boats, and now none were in sight. This is not saying there was no tonnage on the lakes in those days, for there was quite a fleet of light-draught schooners, two full-rigged barques (the Utica and the Morgan) and also a square-rigged brig, the Robert Burns. Large side-wheel steamers were numerous. Cord-wood was the fuel they generally used. Spirit compasses were very scarce. The rules of the road were limited. There were no patent logs, no fog syrens, no reliable charts or books of sailing directions and only five or six lighthouses on all Lake Huron. There were no lights, beacons or buoys between Detour and the Sault, or between Pt. au Barques and Thunder bay.

Now the Agnes Ann was a standing keel vessel, with full bows like a Dutch galliot, heavy counters with low transom, which when laden, was under water. So she was a slow, hard steering but good heavy weather vessel. When about abreast of Sturgeon point, (the fog being thick) the wind canted northeast and blew so hard that she was single reefed all around, sailing at about six points of the wind. Steadily sounding and getting no bottom we continued on this tack until the water became smooth and we got soundings which showed that we were under the lee of North point. After reaching shoaler water and good anchorage we let go the anchor. The next day it cleared up but blew harder. The small boat was lowered and we went ashore. We landed at the mouth of a river but we could not name it. There was a sand bar across its mouth. I know now that it was Thunder bay river. There was not a soul to be seen or anything else to show that anyone lived there. Little did we think that Alpena would rise out of this wilderness, or that the waters of the river would ever bear the large fleets of vessels which have visited it since that time. Even after the war with the south, I

was there with the brigantine Resolute and took on a load of pine timber and plank for Cleveland. We had to load at the mouth of the river, one side of which was sand beach and on the other a kind of pier built of edgings and slabs.

After remaining here three days, the wind shifted to the south'ard and we got under way and worked round Thunder bay island light, and as was customary then in fine weather the lighthouse keeper rowed out to meet us, throwing four white fish over the rail. In return we gave him venison, as well as several old newspapers which were, however, new to him. He gave us letters to mail at the first opportunity, but opportunities were scarce and the letters were not mailed until we reached the Sault. We shaped our course as best we knew for Detour, and in the morning we were heading into False Detour, and should have gone in but we could not find a lighthouse. We knew there was one there, so we hauled our wind and stood to the westward. We soon espied the lighthouse, which had only been built about a year. Probably they lit it only when they expected the propeller from Detroit. The wind being still southerly we continued and by sounding and guessing, and having the knowledge that our course was westerly to Mud lake, we succeeded in reaching near where the turning buoy is now located on Mud lake. We let go our anchor. Not a soul had been seen nor could we see. Both captain and mate allowed we should go further to the westward, but the wind hauled to westward and we laid there three days. One night while lying at anchor, I crawled into the bight of the foresail with another sailor for a night's rest. We had quilts rolled around us. We carelessly left the foorsheet unfastened. In the night a heavy squall struck us right abeam. The foresail blew out and we found ourselves in the sail on the water, and if the squall had not roused out the rest of the crew we should surely have been drowned. As it was we swallowed more water than we wanted for a drink. An Indian Mackinaw boat came alongside. They told us to take the little island now called Pilot island over our stern and steer for what is now called Winter's point. From the mast head the deep water could in a measure be seen, but we got hard and fast at the lower end of Little Mud lake. Here was a camp of Indians and half-breeds with their birch bark wigwams and canoes. Paying too much attention to them and too little to navigation of the vessel, I think, was the cause of our stranding. An anchor was carried out and a derrick was used and with heavy heaving at the windlass (for there were no patent purchases then) and derrick, the vessel was floated. One of the halfbreeds proffered his services as pilot and was accepted. The mosquitos were immensely plenty. Whenever our dark-skinned cook appeared on deck the natives would smile and look curious. Probably not one of them had ever seen a colored individual as dark as our cook. He noticed this and laughed with the rest. With our pilot on board we got under way the next day with a light, fair wind, and reached the foot of Nebish rapids. The wind was too light and we had to come too. A camp of Garden river Indians was at the foot of Sugar island. Following the Canadian shore we came to a crib, placed on a bar, with only 9 ft. 6 in. depth of water on it. Moored to this crib was a large lighter with a derrick on it. When a propeller then in the trade at this point went up or down drawing too much water, the lighter was used to get over the bar. We spent four days here, much of the time ashore. The vessel passed the bar and on to Church's landing. Upon arriving at Garden River, an Indian village, night was coming on and as the wind was light we made our vessel fast to the trees. The pilot went ashore and presently returned with his father and mother. His sire was a Scotchman, a methodist minister, his mother a halfbreed. Our deck was soon full of Indians, a very well behaved set of people. The wind was ahead next day, so the captain, mate and pilot went back into the country with guns and fishing tackle and returned near night with a good string of speckled trout, a jack rabbit and some partridge.

A fresh breeze sprang up in the morning and it took us up to the Hudson Bay Co.'s post. This post, or fort, and a few log houses was all there was on the Canadian side of the river. The houses were mostly inhabited by the servants and voyageurs of the company. We unloaded into large batteau (boats sharp at each end, and flat bottomed of about 10 tons capacity). Whilst unloading I saw that we carried a large quantity of single-barreled, muzzle-loading guns, well suited for buck shot. The guns were made in England and were called chief and squaw pieces. We carried also a large stock of ammunition, spring traps and blankets, as well as many barrels of lard, pork, flour and salt from Liverpool. On Sunday we went over in our yawl to the American side and walked on dry ground where the canal locks are now. The American flag was flying at the fort. I do not remember if there were any earthworks thrown up in the fort,

but I do remember some buildings there, surrounded by a stockade of long cedar posts, side by side, sharpened at the top and with loop holes to permit a man to shoot through with a musket. I know they had one or more cannon, as every night at sundown it was fired, and down came the flag. The few soldiers there looked strong and healthy. There was plenty of deer, bear, moose and wolves, besides partridge and rabbits. At the foot of the rapids were plenty of whitefish which were caught with a hoop net on a pole. It took us a week to unload. Between Topsail island and Partridge point, on the return trip, Capt. Duncan, with my rifle, shot at four deer standing by the side of the river. We lost sight of them in the woods. As we entered upper Lake George the wind hauled ahead, and being light, we beat across to Garden River. The current was pretty strong and we lowered our sails and towed her through to lower Lake George. With sail set we worked down to the head of Nebish rapids; lowering all our sail except the foresail, we headed her up the river. The current being stronger than the wind she backed down to the foot of Sugar island. Here we made sail and worked down to the foot of Little Mud lake where we landed our pilot. He was very anxious to possess my rifle and he got it for his pilotage. The next day we passed Detour finding an east wind and thick fog on Lake Huron. When abreast of Thunder bay and about eight miles out the fog disappeared and we fell into company with five schooners and a side-wheel steamer. We were two days getting down to Sarnia after an absence of twenty-seven days.

#### INFLUX INTO THE CANADIAN NORTHWEST.

According to a Winnipeg, Man., special to the New York Evening Post, the extent of immigration into Manitoba and the northwest territories from the United States is little understood in the east. Sir Charles Dilke's prophecy of twelve years ago that these fertile lands would become the wealth center of the Dominion is already being fulfilled. For the year ending June, 30, 1902, 19,570 persons from the United States took up homesteads in Manitoba and the northwest territories, against 5,197 in the preceding year. Actual settlers number five times as many, as only heads of families can take up homesteads. In 1900 land along the Canadian Pacific was worth \$3 an acre; now there are few obtainable lots close to the line, while the price of the nearest is \$7 to \$8 an acre. An examination of Winnipeg hotel registers shows that 40 per cent. of the visitors are from the United States. It is said that the cheapness of land makes it possible to produce wheat and flour at less cost than in Minnesota or the Dakotas. Millers of Minneapolis and St. Paul are anxious to get Canadian wheat, and are advocating reciprocity with Canada with the idea of having the grain duty removed. This influx of Americans is proving of great benefit to Canadian development, especially in the line of capital, as the American settlers are bringing millions with them into the country.

#### ANOTHER UNLOADING RECORD

Another record has been established in unloading the steamer James H. Hoyt—and this time it is a night record as the work was done entirely by electric light. The steamer put into Conneaut last Thursday night and was unloaded in 4 hours and 45 minutes. Four of the Hulett automatic unloading machines, operated by seventeen men, loaded 107 cars from the vessel in 3 hours and 30 minutes, taking out about 85 per cent. of her cargo. The steamer was then taken to the McMyler fast plant where the remaining 15 per cent. of her cargo was loaded into eighteen cars in 1 hour and 24 minutes, making a total of 4 hours and 54 minutes. One of the Hulett machines averaged a car every 4 minutes, or 12½ tons a minute. This is three times the speed that the Hulett machines were guaranteed to attain. It is stated that with two extra men to each machine to shovel within reach of the grabs, that portion of the cargo which cannot be reached by the grabs, that the entire 100 per cent. can be unloaded by these machines, but labor conditions at present prevent the employment of men for that purpose. This same steamer was unloaded recently at the docks of the Illinois Steel Co., Chicago, by the Mason & Hoover machine. Detailed particulars regarding this performance are not at hand but it is understood that the steamer was unloaded in 5 hours and 45 minutes with ten machines and thirty-six men.

#### DANGERS OF CANALING UPON THE ERIE.

Those who go out upon the sea in ships regard their calling as more or less hazardous, but little do they appreciate the dangers of canalizing upon the raging Erie. The following clipping, which appeared in one of the evening papers of Buffalo on Monday last in the form of a dispatch from Tonawanda, tells briefly and slightly of the perils fortunately escaped by the crew of the John Owens, before daybreak that morning when the weather was unseasonably cold:

"The steamer John Owens of the Buffalo, Rochester & Syracuse Transit Co. sank in the Erie canal while lying at the heel-path side of the stream, opposite the company's local station, shortly after 3 o'clock this morning. That none of the crew of seven men were drowned is considered miraculous. They claim that it could not have been over a minute after the boat was discovered to be filling with water that it sank, as every mem-

ber of the crew was on board asleep. The Owen arrived here at 2:10 in the morning and was tied up to await daylight. On board was one of the largest cargoes of freight loaded at Buffalo this season for eastern points. The crew, consisting of the following men, turned into their bunks for the remainder of the night: Capt. Harry Brush, of Middleport; Lewis McBeth, of Weedsport; Dudley Wilcox, of Buffalo; Edward Philips, of Palmyra; R. W. Busby and Philip Herrin, of Port Byron, and R. Roberts of Clyde. They were awakened by the steamer lurching to one side. They hardly reached deck before the boat lurched back and sank. Herrin was the last man out of the forecastle and as he was climbing up the ladder a large volume of water came through the hatch and nearly forced him back. He clung desperately to the ladder and was just pulling himself onto the deck as the boat sank. The Owen is one of the oldest boats being operated by the owners. It is thought she sprang a leak while at the dock here. The boat and cargo were insured. The upper cabin of the vessel protrudes about 3 ft. above water."

#### SUMMARY OF NAVAL CONSTRUCTION

The monthly summary of naval construction shows steady progress. A ship is not completed until she is in commission, therefore the Maine, which has just had her trial trip, is represented as of 94 per cent. completed. All the torpedo boats and torpedo boat destroyers are well advanced in construction and some of them are practically structurally complete. Following is the summary:

Name.	Building at	Degree of completion.	
		Aug. 7.	Sept. 7.
Maine.....	Cramp & Sons	92	94
Missouri.....	Newport News Co.	68	71
Ohio.....	Union Iron Works	61	62
Virginia.....	Newport News Co.	3	5
Nebraska.....	Moran Bros. Co.	0	0
Georgia.....	Bath Iron Works	13	14
New Jersey.....	Fore River Ship & Engine Co.	11	13
Rhode Island.....	Fore River Ship & Engine Co.	11	13
<b>Armored Cruisers.</b>			
Pennsylvania.....	Cramp & Sons	29	31
West Virginia.....	Newport News Co.	28	31
California.....	Union Iron Works	10	12
Colorado.....	Cramp & Sons	32	33
Maryland.....	Newport News Co.	25	29
South Dakota.....	Union Iron Works	7	9
<b>Protected Cruisers.</b>			
Denver.....	Neafie & Levy	83	83
Des Moines.....	Fore River Ship & Engine Co.	73	74
Chattanooga.....	Lewis Nixon	61	62
Galveston.....	Wm. R. Trig Co.	63	64
Tacoma.....	Union Iron Works	52	53
Cleveland.....	Bath Iron Works	83	86
St. Louis.....	Neafie & Levy	3	4
Milwaukee.....	Union Iron Works	4	5
Charleston.....	Newport News Co.	11	14
<b>Monitors.</b>			
Arkansas.....	Newport News Co.	98	99
Nevada.....	Bath Iron Works	94	95
Florida.....	Lewis Nixon	93	94
Wyoming.....	Union Iron Works	91	93
<b>Torpedo Boat Destroyers.</b>			
Bainbridge.....	Neafie & Levy	99	99
Barry.....	Neafie & Levy	99	99
Chauncey.....	Neafie & Levy	99	99
Hopkins.....	Harlan & Hollingsworth	94	94
Hull.....	Harlan & Hollingsworth	94	94
Lawrence.....	Fore River Ship & Engine Co.	99	99
McDonough.....	Fore River Ship & Engine Co.	98	98
Stewart.....	Gas Engine & Power Co.	82	90
Whipple.....	Maryland Steel Co.	98	99
Worden.....	Maryland Steel Co.	95	98
<b>Torpedo Boats.</b>			
Stringham.....	Harlan & Hollingsworth	98	98
Goldsborough.....	Wolff & Zwicker	97	98
Blakely.....	Geo. Lawley & Son	98	99
Nicholson.....	Lewis Nixon	98	98
O'Brien.....	Lewis Nixon	98	98
Tingey.....	Columbia Iron Works	74	74
<b>Submarine Torpedo Boats.</b>			
Plunger.....	Lewis Nixon	95	96
Adder.....	Lewis Nixon	99	99
Grampus.....	Union Works	86	88
Moccasin.....	Lewis Nixon	99	99
Pike.....	Union Iron Works	79	80
Porpoise.....	Lewis Nixon	98	98
Shark.....	Lewis Nixon	97	98

It is understood that twelve Brown hoist plants in Cleveland, twelve Brown hoists in Erie and twelve King Bridge company plants in Ashtabula are to be equipped with Hulett automatic buckets.

## WHAT FOREIGN NAVIES ARE DOING.

The naval annual for 1902, just published by the naval intelligence bureau, with the title "Notes on Naval Progress" is full of interesting information, gathered and compiled under the direction of Capt. Charles D. Sigsbee, chief intelligence officer. The scope of the volume is entirely foreign, the idea being to furnish American naval officers with all the data obtainable as to what was done abroad in the way of naval progress during the past year. In view of the forthcoming maneuvers of the North Atlantic, the European and the South Atlantic squadrons in the West Indies, the articles by Lieut. Louis M. Nulton on the British, French, German and Russian naval games are especially valuable at this time. Another article by Lieut. Nulton shows that the British navy is devoting much attention to target practice and that some splendid results have been achieved. Lieut. Com'dr. John H. Gibbons, in an instructive and carefully prepared article on ships and torpedo boats, concludes with a record of foreign marine casualties, which is a startling commentary on the dangers of navigating warships and handling explosives. In the engineering notes, prepared by Lieut. Charles L. Poor, much space is given to a discussion of the pressing question of the use of liquid fuel for obtaining motive power on naval vessels. Lieut. Poor also treats exhaustively the important matter of wireless telegraphy in signalling at sea. But while these things are of great interest and value, naval officers regard as more important the showing made in the volume of the efforts of European countries and Japan to increase their respective fleets. This subject is treated generally and specifically by Lieut. Nulton in a series of articles entitled, "Notes on Naval Budgets of 1902-03."

For many reasons and particularly because Germany is making rapid strides toward the completion of a modern navy comparatively greater than the advances of any other nation, Lieut. Nulton's review of the German naval program is of most importance. After saying that the estimates for 1902, as submitted to the Reichstag, amounted to 209,082,089 marks, an increase of 12,347,917 marks over last year's estimates, Lieut. Nulton gives a brief review of Germany's efforts toward the creation of a great fleet. He says:

"The increase in the German navy in both personnel and material, has been systematic, steady and rapid. There is little doubt that the compliance of the government and people with the well known desire of the German emperor for a strong navy is due, to a large extent, to the influence of the German navy league, through its well directed efforts toward creating a positive and lively interest in the navy on the part of the people. The efforts of the league have been directed with more than ordinary ability, and its influence, as the result of its efforts, could only be entirely satisfactory to those concerned in its direction. A law passed April 10, 1898, provided for an increase in the fleet, the increase to be completed in six years. The strength of the fleet as contemplated by this law was attained in practically one-half the proposed period, and in January, 1900, the increase of the fleet was again before the Reichstag, with the result that a considerable addition to the fleet was authorized in June of that year. The building program of this authorization was to cover a period originally intended to extend to the year 1916. The fact that the increase authorized by the law of 1898 was carried out long before the expiration of the period contemplated, led the council to refrain from definitely fixing the year 1916, but to build as financial and other circumstances would permit; in other words, to complete the program authorized in 1900 as rapidly as possible. This program (1900) is now within a few years of completion, and it is highly probable that the actual material strength in number of ships, without counting those over the prescribed age, will be reached by 1908, if not in 1907. By counting vessels still in service, but beyond the efficient age limit, the prescribed strength could probably be reached in at least three years."

Lieut. Nulton appends the following table showing what is contemplated by Germany:

Building Program.	Battle-ships.	Arm'd Cr's.	Cruisers.
Total acquired by law of 1900.....	38	14	38
Built and building.....	29	11	30
Remaining to complete program.....	9	3	8
Authorized in 1902-03 budget.....	2	1	3
Yet to be authorized to complete program....	7	2	5

Of Russian naval progress Lieut. Nulton has this to say:

"Reports indicate that this year's building program contemplates three battleships and two armored cruisers. Since the adoption of this program it is reported that the promulgation of the Anglo-Japanese alliance has caused an appropriation by Russia for four battleships and two armored cruisers in addition to the regular program. These ships will be built abroad if the capacity of the home yards will not admit of them being built here."

In Japan a new ship building program is being considered, but has not, Lieut. Nulton says, been definitely promulgated. It is said that this program, for the six years beginning 1904, will comprise the construction of four battleships of 15,000 tons each, two armored cruisers of 9,000 tons each, four second-class cruisers of 5,000 tons each, fifteen destroyers and fifty torpedo boats.

France's building program for this year, while announced to include several vessels which will not be laid down until next year, will definitely include one battleship, two armored cruisers, two destroyers, and sixteen torpedo boats, and the purchase of material for three battleships and thirteen submarines.

The British estimates for this year and next have already been printed in American newspapers. They include provision for two battleships, two armored cruisers, two third-class cruisers, four scouts, four torpedo boats and four submarines. Last year the ships authorized numbered twenty-nine, including three battleships and six armored cruisers.

In his introduction to his paper on "Naval Construction Abroad," Lieut Com'dr. Gibbons gives a brief glance at the general tendencies of foreign powers. He says:

"The construction of ships for the fleets of the leading naval powers has gone on actively during the last year, and the new estimates show either an adherence to a well-defined program for a steady increase, or a desire to make such additions as the present financial condition of the various countries warrants." While there has been no marked change in the design of ships, the tendency has been toward greater displacement in battleships and armored cruisers, better protection, and the massing of guns of the second caliber in a central citadel instead of separating them in casemates.

"Italy has authorized three more ships of the Vittorio Emanuele type, which, with a displacement of 12,625 tons, will carry a main battery of two 12-in. guns in hooded barbettes and 12-in. guns in turrets and have a speed of 22 knots.

"France continues to lead in the number of submarine and submersible torpedo boats laid down, and experiments are going on with those already launched. England has launched five submarines recently authorized and experiments are now going on to determine the value of the design. Austria, Italy, Russia, Sweden and some of the South American states are experimenting with different types of submarines."

## THE PACIFIC CABLE.

Officers of the war and navy department are very much interested in the Pacific cable. It is now expected to be completed within two or three years. The cable will be generally 1 in. in diameter but near the shores it will be 2½ in. The steamer Silver Town is now on the way to San Francisco with 3,000 miles of wire aboard. The report of Lieut. Com'dr. Hodges, commanding the survey ship Nero, in 1900, relative to the soundings taken between Honolulu and Guam, is of great interest, as in this work he found the deepest abyss in the ocean ever reached by the sounding lead. In one spot, in fact, no bottom was found after paying out 4913 fathoms of the line. Another line was procured, and a sounding of 5269 fathoms was made—within 66 ft. of 6 miles.

An almost level plain of soft mud, ideal for cable purposes, stretches from Honolulu to the Midway islands, at a general depth of about 2,700 fathoms. The bed of the ocean between Midway islands and Guam, along the probable route, is another level plain of from 3,100 to 3,200 fathoms depth. It is, however, broken somewhat by submarine reefs and mountain ranges. The first 1,000 miles from Midway, with the exception of an isolated peak not far from Ocean island, rising to within 82 fathoms of the surface, is entirely level. A short distance east of the great mountain range which forms the Ladrone group lies "Nero deep," the abyss discovered by the steamer Nero. A practicable cable route was found to be northward of this deep. Its southern limits are unknown, and may present even greater depths than those found by the Nero. The temperature of the ocean at 5,070 fathoms was found to be 35.90° F., and at 5,101 fathoms it was 36° F.

The cable to be laid is of English manufacture. The India rubber covering it was made in Philadelphia. No adequate facilities exist in the United States for the construction of a cable of the quality required. The weight of the copper wire in this Pacific cable will be 500 lbs. per knot, as against 200 lbs. in the old-fashioned cables. The method of laying it is ingenious, machinery being provided to give the proper bend to the cable and prevent it from paying out too fast. The tension of the cable is carefully measured, and it is so laid that it does not kink or coil.

The distance from Washington to Manila by telegraph and cable will be about 10,250 miles, as follows: Washington to San Francisco, 3,300 miles; San Francisco to Honolulu, 2,089 miles; Honolulu to Wake Island, 2,040 miles; Wake Island to Guam, 1,290 miles; Guam to Manila, 1,520 miles. The route employed at present is as follows: Washington to New York by land; thence to Valentia, Ireland, by cable; to Brighton, England, by cable and land; to Havre, France, cable; to Marseilles, land; to Alexandria, Egypt, cable; to Suez, land; to Aden, Arabia, cable; to Bombay, India, cable; to Madras, India, land; to Singapore, Malayan Peninsular, cable; to Saigon, Cochinchina, cable; to Hong Kong, cable; to Bolingo, P. I., cable; to Manila, land; total distance, 14,000 miles.

It is understood that, for the present at least, the building of the two express steamers proposed by the Cunard Steamship Co. has been abandoned.

## SHIP BUILDING AT NEWPORT NEWS.

Newport News, Va., Sept. 17.—The new Pacific mail steamship Siberia went last week on her forty-eight hours' builder's trial, returning to the ship yard after a most successful run. The Siberia is a sister of the Korea, which is now on her maiden voyage across the Pacific from San Francisco to Hong Kong, after a remarkably fast trip around the Horn from Newport News. She has a displacement of 18,600 tons and cost about \$2,000,000 completed. Capt. Smith, master of the Siberia, arrived in time from San Francisco to take the ship to sea on her trial and Capt. Porter first officer, also went out in his official capacity. Gen. Supt. Walter A. Post, of the Newport News Ship Building & Dry Dock Co., had a large party of guests aboard, prominent among whom were R. P. Schwerin, president of the Pacific Mail Steamship Co.; George H. Ferguson, inspector for the Pacific Mail; Capt. Richard Inch, United States navy, senior inspector of machinery at the ship yard; Com'dr. Perry, United States navy, who came down from Washington especially to make the trip; M. B. Crowell, of the Old Dominion Steamship Co., and Col. G. A. Keeler, manager of the Hotel Chamberlin at Old Point. The Siberia was required to make an average of 18 knots an hour and this she easily maintained, as did the Korea. The Siberia will be ready to leave the ship yard for San Francisco in about two weeks, being practically completed and much farther advanced in this respect than was the Korea when she went out on her builder's trial.

The new monitor Arkansas was towed over to the navy yard at Portsmouth last week and delivered to the government. She will be placed in commission in a few days and Com'dr. Vreeland, formerly a member of the naval board of inspection and survey will command the new warship. The Arkansas will be supplied with stores and ammunition at the navy yard and fitted out for service with the North Atlantic squadron in the winter maneuvers in southern waters.

Added light on the subject of oil as a naval fuel will be given shortly as a result of experiments being conducted in this line on the torpedo boat Talbot, which is undergoing repairs at the navy yard. The navy department has issued orders, it is stated, for her equipment as an oil burner. When so equipped she will go on a sea trial under the new fuel conditions and later will proceed to Annapolis where engineers, officers and naval cadets will be instructed in the use of crude petroleum for generating steam.

The amount of land necessary for the contemplated improvements at the navy yard is 272 acres and formal proceedings have been instituted in the United States court for the acquisition of the acreage in question, the papers being served on J. H. Dingree, of Philadelphia, president of the company owning the Schmoele tract near the navy yard.

## AT THE WORKS OF THE WILLIAM R. TRIGG CO.

Richmond, Va., Sept. 17.—The ship yard of the William R. Trigg Co. is a hive of industry. While it is only a little over three years since the keel of the first vessel was laid, the yard has delivered to the government the destroyers Dale and Decatur and the torpedo boats Shubrick, Stockton and Thornton; to private firms the stern-wheel steamer Samuel N. Lapsley, now in commission on the Congo river, Africa; the Chesapeake & Ohio railway passenger steamer Virginia, holding the speed record for the Chesapeake bay; the Old Dominion steamer Berkeley for the James river service, and the tugboat Lancaster, flagship of the New York harbor service of the Pennsylvania railroad.

The company at present has the following vessels under construction: The cruiser Galveston of the United States navy of the following dimensions: Length, 309 ft.; beam, 44 ft.; depth, 31 ft.; 3,200 tons displacement; 4,500 H. P.; 16½ knots guaranteed speed. This vessel will be launched during October. She has already received her boilers, and her engines are well under way. The revenue cutter Tuscarora is receiving her finishing touches and is to be delivered at Baltimore about Oct. 1. She will probably go into commission on the great lakes in the spring of 1903. Work is progressing rapidly upon the revenue cutter Mohawk for the Porto Rico station. She is at present receiving her machinery. Her dimensions are: Length, 206 ft.; breadth, 32 ft.; depth, 17 ft.; displacement, 850 tons; horse power, 2,100. The hull of the twin-screw suction dredge Benyaurd designed for use in the Southwest passage of the Mississippi river, is in frame and is being plated. Her dimensions are: Length, 272 ft.; beam, 48 ft.; depth, 23 ft.; displacement, 4,000 tons; horse power, 1,300. Work is well under way on the steamer Capt. A. F. Lucas for the Standard Oil Co. She is 375 ft. long, 50 ft. beam and 23 ft. deep. She will have a single screw. Her displacement is 9,000 tons, her horse power 2,000 and she is designed for a speed of 11 knots. The company is also building two tugs, Bristol and Chester, for the Pennsylvania Railroad Co. of the following dimensions: Length, 105 ft.; beam, 22 ft.; depth, 12 ft.; displacement, 250 tons. The keels of these tugs have been laid and the machinery is under construction. A sea-going tug is also under construction for service between Norfolk and Cape Charles. The tug will be known as the Cape Charles and will be of the following dimensions: Length, 122 ft.; beam, 24 ft.; depth, 12 ft. 7 in. Her engine will have cylinders 20 and 40 in. by 28-in. stroke, supplied with steam from one Scotch boiler. Her keel has been laid.

## TRIAL TRIP OF WORDEN AND BAINBRIDGE.

The torpedo boat destroyer Worden, built by the Maryland Steel Co. at Sparrow Point, Md., and the Bainbridge, built by the Neafie & Levy Ship & Engine Building Co., Philadelphia, Pa., successfully completed their standardization speed trial tests over the Barren island course, Chesapeake bay, last week. The contract requirements were that the boats should develop an average speed of 28 knots for two consecutive hours' running. The Worden's official speed for one mile was 30.05 knots, and for the hour, 28.15 knots. The Bainbridge's speed was 28.72 knots. In this connection it is interesting to recur to the report of Naval Constructor J. H. Linnard and Lieut. L. H. Chandler to the chief of the bureau of construction and repair on torpedo boats under date of November, 1901. The report says:

"Of all the destroyers those giving the best evidence of strength are the three built by the Maryland Steel Co., the Truxton, Whipple and Worden, which are on the contractors own designs. Their original designed displacement on trial was to be 433 tons, but they will considerably exceed this weight. The scantling and construction of these boats are such as to make them thoroughly strong, and it is believed that they are capable of going to sea in any weather, but the contractors are apparently not sanguine of obtaining the contract speed of 30 knots, and we are of the opinion that it is very doubtful whether they will attain the speed of 28 knots, the minimum allowed by the contract without rejection of the vessel. With reference to those vessels it may be said that as far as general service is concerned, in our judgment, they will be the best vessels in actual service of all those examined, provided no unexpected trouble in their machinery develops on trial."

Following is the log of the Worden on the official trial on the Barren island course, Sept. 11:

Run.	Revolutions.			Time. Min. Sec.
	Port.	Starboard.	Steam.	
1	622	642	114	2 30.4
2	650	665	116	2 34.0
3	637	656	146	2 180
4	657	672	146	2 22.8
5	639	651	173.5	2 10.8
6	664	674	175	2 14.5
7	651	660	202	2 037
8	674	684	207	2 06.7
9	668	671	238.5	1 58.0
10	689	690	232	2 03.2

The corrected official time for the ninth run gives a speed of 30.05 knots per hour. On the hour's run on Sept. 12, the revolutions were 311.35 port and 311.55 starboard, giving a speed of 28.15 knots per hour. This makes the Worden the fastest of the destroyers now under construction for the United States navy, so far as they have been tried.

## ANOTHER LINE TO THE FAR EAST.

Increased interest in trade with China and elsewhere in the orient is indicated by the announcement that another steamship company has been formed by strong financial interests of New York and will soon enter into active competition for commerce between New York and the far east. The new line from New York is to be operated by the American-Asiatic Steamship Co., an organization formed under the laws of Maine with an authorized capital of \$500,000. The sailing will be monthly and the first vessel is expected to be dispatched from New York during October. The officers of the new company are William Barclay Parsons, president; D. Leroy Dresser, vice president; T. Ashley Sparks, secretary and treasurer. The directors, besides the officers named are August Belmont, C. A. Tomes, Cornelius Vanderbilt and John D. Gluck, Luther Kountze of Kountze Bros., Vermilye & Co., and J. Crosby Brown of Brown Bros., are also shareholders. Vessels of the new line will call at Singapore, Manila, Hong Kong, Shanghai, Nagasaki, Kobe, Moji and Yokohama.

The service will be inaugurated by the steamship Gibraltar, which has been chartered by the company. It is the intention of the company, however, to build its own vessels. Shewan, Tomes & Co., who have their own offices in leading ports in the far east and have operated a steamship service from ports in China and Japan, such as Yokohama, Kobe, Shanghai, Foochow, Amoy, Hong Kong and the Straits Settlements, to New York, will become general agents in the orient for the new company. Formerly they have been sending out nine or ten boats a year. All of these vessels have been chartered and have not taken return cargoes from this port—that is to China and Japan. The new enterprise will therefore complete the line by affording an outward service. In fact the American-Asiatic Steamship Co. will not only establish a new line from this port, but will also take charge of the business already established in the orient. The steamship Gibraltar is a new vessel 344 ft. in length, 49 ft. beam and 17 ft. 9 in. in depth. In this connection the news may be of interest that the Union Pacific Railroad Co., through the Oregon Short Line Co., which it controls, has concluded to try for the carrying trade between the Pacific coast and Japan and China and the east. At a special meeting of the stockholders of the Oregon Short Line to be held at Salt Lake city on Oct. 9, an amendment of the articles of association will be submitted to empower the company to engage in the steamship business.

## COMMERCIAL DEVELOPMENT AND THE RAILWAYS

Mr. George H. Daniels, general passenger agent of the New York Central, recently delivered an address before an assembly at Chautauqua upon the commercial development of the United States as fostered by the railways that contained many points of great historical interest. It is therefore reproduced in part. He said among many things:

"One of our great writers has said that this is an age of transportation. Transportation underlies material prosperity in every department of commerce. Without transportation commerce would be impossible. Those states and nations are rich, powerful and enlightened whose transportation facilities are best and most extended. The dying nations are those with little or no transportation facilities. Mr. Mulhall, the British statistician, in his work on 'The Wealth of Nations,' said of the United States in 1895: 'If we take a survey of mankind, in ancient or modern times, as regards the physical, mechanical and intellectual force of nations, we find nothing to compare with the United States.' Mr. Mulhall proved by his statistics that the working power of a single person in the United States was twice that of a German or Frenchman, more than three times that of an Austrian and five times that of an Italian. He said the United States was then the richest country in the world, its wealth exceeding that of Great Britain by 35 per cent. and added that in the history of the human race no nation ever before possessed 41,000,000 of instructed citizens.

"During the past ten years the Baldwin Locomotive Works have sent to Japan 255 locomotives; to China, thirty-one; Russia, 379; England, seventy-two, and to other countries, 1,653. The Rogers Locomotive Works have built 584 locomotives for foreign countries, including Canada, Mexico, South America, Panama, Costa Rica, Cuba, Jamaica, Spain, Australia, New Zealand, Japan and China. The American Locomotive Co. has built locomotives for foreign countries as follows: 265 for Japan, seventeen for England, seven for China, fifty-one for Russia, and several hundred for the British colonies, Mexico and Central and South America. In this connection it will be interesting to note in passing that the second American locomotive was built at the West Point foundry, near Cold Spring, on the Hudson river, and was called the Best Friend, and from that day to this the locomotive has been one of the best friends of this republic.

"But it is not alone our locomotives that have attracted the attention of foreigners who have visited our shores, our railway equipment generally has commanded admiration and is now receiving the highest compliment, namely, imitation by many of our sister nations.

"One of the reasons for the introduction into other countries of our manufactures and products of all kinds, is that Americans have the ability to not only do things well, but to do them quickly; and this practice, which is now general, has been greatly stimulated by the example set by the railroads. There is another reason for our strength, our wealth and our ability to do things, and it is covered by Mr. Mulhall's brief statement, previously quoted, that 'in the history of the human race, no nation ever before possessed 41,000,000 of instructed citizens.' These facts should encourage all our educators, and especially Chautauqua, which in numerous ways stimulates not only the youth, but the middle aged of our country, to improve their opportunities for obtaining knowledge, and so increase the means of making themselves useful citizens of the freest as well as the richest country in the world.

"Railroad mileage has steadily grown until now we have 200,000 miles of steam railway in the United States. These railroads employ over 1,000,000 men, whose wages amount to over \$600,000,000 annually. Their capital is over \$12,000,000,000 and their earnings last year exceeded \$1,500,000,000. They carried more than 600,000,000 passengers last year, and 1,100,000,000 tons of freight. We are all impressed by the object lessons which are the essential element of the kindergarten system. I want to give you one object lesson in regard to American railways. In 1851 the American Railway Guide for the United States, published in New York, with branch offices in Boston, Springfield, Philadelphia and many other cities, consisted of 144 pages, 5 $\frac{1}{4}$  by 3 $\frac{3}{4}$  in. It contained the time tables and information regarding 149 railroads. The Official Guide of the United States for July, 1902, which I hold in my hand, contains the time tables and information regarding 957 railways, requiring over 900 pages of this size to show it. In 1851 there were a little over 9,000 miles of railway open for traffic in the United States. In 1902 there are over 200,000 miles in operation."

After illustrating at some length the growth of American commerce, the influence of our railway methods upon other countries, the recent visits of individuals and commissions from foreign countries to study our systems, etc., Mr. Daniels dwelt upon the decadence of canal traffic and the reason therefor. He said:

"The third cause for the failure of the canals is the general demand of the American public for quick time. A shipper having 100,000 barrels of flour, or 1,000,000 bushels of grain for export, must move it from Buffalo to New York within a specified time, and he cannot risk the slow process of the canal. A short time ago the lake steamer Abyssinia arrived in Buffalo on a Friday evening with 40,000 bushels of grain, while the Cevic of the White Star line was at her pier in New York about to sail with water for ballast unless she could get a cargo of grain. This grain

from the Abyssinia was quickly trans-shipped at Buffalo to the cars of the New York Central, left Buffalo Saturday evening and was in the hold of the Cevic shortly after noon on Monday. The dispatch with which this grain was handled makes a record that has never been equaled by rail, and of course could not be approached by canal.

"In 1875 the states east of the Missouri river were sending food and clothing to the starving people of Kansas. Thanks to the facilities afforded by the railroads, they expect the corn crop of Kansas for 1902 to be the banner one; 8,000,000 acres have been planted, and at the previous average per acre would yield something over 300,000,000 bus. It seems but a very few years since I made my first trip to Colorado, and stopped on my way at the home of 'Buffalo Bill.' at North Platte, Neb., on the Union Pacific. At Ogalalla, fifty-one miles west of North Platte, the Sioux Indians were roaming over the prairies and making more or less trouble for the settlers who ventured so far out of the beaten paths of civilization. The Nebraska corn crop for 1902 covers nearly 8,000,000 acres, and is expected to yield 40 bus. to the acre, or in the neighborhood of 300,000,000 bus. In the banner year of 1896 Nebraska planted 7,700,000 acres of corn and produced 298,600,000 bus., or about thirty-eight bushels per acre.

"Previous to the construction of the Northern Pacific, the Great Northern, Northwestern, St. Paul, Burlington, Rock Island and other railways that traverse that wonderful region known as the 'wheat belt,' there was nothing to be seen but prairie grass and an occasional band of untamed savages. Minnesota and North and South Dakota in 1898 shipped 220,000,000 bus. of wheat. The prospects for the present season all point to a very large yield, although it is doubtful if it will exceed the crop of 1898.

"The wheat crop of California in 1899 was 37,000,000 bus. The largest crop ever produced in California was in 1880, when, owing to exceptionally favorable weather conditions, that state produced 63,000,000 bus. The mineral product of California for the year 1900 amounted to \$33,000,000. The vineyards and orange groves of California would be of practically little value were it not for the fact that the railroads, by their trains of refrigerator and ventilated fruit cars, make it possible to transport the products of her fertile valleys to all sections of the country. There were shipped from California alone in 1901, 82,731 carloads of fruits, vegetables, wines and brandy, by rail and sea. California produced in 1901, 29,800,000 lbs. of butter; 11,300,000 lbs. of cheese; 69,000 tons of beet sugar products, and 48,000 bales of hops. California also produced 27,000,000 lbs. of wool in 1901, and 608,000,000 ft. of lumber.

"It seems but yesterday since the railroads were completed into Portland, Ore., Tacoma and Seattle, Wash., and it is marvelous that for the year 1901 there was exported from the Columbia river valley 17,000,000 bu. of wheat, and from the Puget sound region 16,000,000 bushels. Oregon and Washington form the northwest corner of the territory of the United States south of the line of British Columbia, and are directly on the route to our extreme northwest possession, Alaska. The wheat crop of the states of Oregon and Washington for the year 1901 was 51,500,000 bushels.

"Colorado, which, with its inexhaustible mines of gold, silver, lead, iron and coal, forms almost an empire in itself, produced in 1901, of gold \$28,000,000; of silver, \$11,000,000; of lead, \$7,000,000, in addition to a magnificent crop of wheat, fruit and vegetables.

"Thanks to her railroad facilities, Montana is to-day the richest mineral region of its size in the world. The value of the precious metals won by the washing, milling and smelting of the ores and gravel mined in Montana during the year 1899 was the largest in its history and amounted to \$68,500,000. The state of Montana produced in that year 23 1/3 per cent. of the copper product of the world, and 61 per cent. of the copper of the United States. It is said that mineral development in Montana is in its infancy, and that what it has already produced is but a bagatelle of the output of the future.

"I am indebted for the statistics regarding the great states referred to, to Mr. J. C. Stubbs, traffic director, and Mr. B. Campbell, assistant traffic director, of the Union and Southern Pacific; Mr. J. M. Hannaford, second vice president, Northern Pacific; Mr. Thomas Miller, freight traffic manager, Chicago Burlington & Quincy; Mr. Paul Morton, second vice president, Atchison, Topeka & Santa Fe; and Mr. A. S. Hughes general traffic manager, Denver & Rio Grande.

"It is beyond question that American railroads to-day furnish the best service in the world, at the lowest rates of fare, at the same time paying their employees very much higher wages than are paid for similar services in any other country on the globe. In the United States the first-class passenger fares in 1898 averaged 1.98 cents per mile, although on some large railways the average was several mills less than 2 cents per mile; in England the first-class fare is 4 cents per mile; third-class fare for vastly inferior service is 2 cents per mile but only on certain parliamentary trains. In Prussia the first-class fare is 3 cents per mile; in Austria, 3.05 cents per mile and in France, 3.36 cents per mile. I may be pardoned for citing two examples of what I mean by the unsurpassed passenger train facilities of American railways. A single locomotive recently hauled a passenger train of sixteen cars, nine of which were sleeping and parlor cars, from New York to Albany, a distance of 143 miles, in three hours and fifteen minutes, which is 44 miles per hour and is the regu-

lar schedule time of this train. The train weighed 1,832,000 lbs., and was 1,212 ft. or nearly a quarter of a mile long. For years the Empire State express has been making the run from New York to Buffalo, 440 miles, in eight hours and fifteen minutes, an average speed of 53 1/3 miles an hour, including four stops—two of them for changing engines—and twenty-eight slow downs on account of running through incorporated towns and cities. For more than 216 of the 440 miles it makes the run on every trip at an average speed of more than 60 miles an hour. For one stretch of 16 miles the regular schedule is 66.33 miles an hour. The weight of this train is 608,000 lbs. and it has a seating capacity of 248 passengers. Recently the Twentieth Century limited on the Lake Shore covered the 134 miles between Brocton and Cleveland in 131 minutes. From Cleveland to Toledo the engineer pushed along over the 113 miles in 103 minutes reaching a speed of 90 miles an hour at some points. These are some of the achievements of American railways in passenger service and in my opinion it is achievements of this character that have made it possible for the United States to expand its commerce with such astounding rapidity."

#### SHIP BUILDING AT PHILADELPHIA AND VICINITY.

Philadelphia, Pa., Sept. 15.—Tank steamer No. 58 of the Standard Oil Co., reached the yard of the Delaware River Ship & Engine Co., Chester, on Sunday for repairs. The tanker was in collision off Sandy Hook light on Sept. 5 with the schooner John Hay. The force of the collision stove a great hole in the steamer's port bow and 1,000 bbls. of oil, of her cargo of 16,000 bbls., were lost. Only the air tight compartments prevented No. 58 from sinking and being a total loss.

The new 100-ft. tug, just completed for the Booth, Daly & Ivins Co., New York, at the Neafie & Levy ship yard, will leave for New York next week.

The keel of the United States cruiser St. Louis is now all down at the Neafie & Levy ship yard, and by next week the work of putting up the frames will be begun.

The American liner St. Louis is scheduled to have new boilers installed at the Cramp ship yard when the repairs to the New York are completed. The latter steamer will be towed around from New York to Cramps in a few days.

Four tugs, building for the Standard Oil Co. at the Neafie & Levy yard, are up in frames and plated. They will be ready for launching in about two weeks.

The new 170-ft. tug for the Central railroad of New Jersey, at Neafie & Levy's, is receiving her plates. She will be launched next month.

#### EARNINGS OF UNITED STATES SHIP BUILDING CO.

Officials of the United States Ship Building Co. have prepared a statement showing the estimated combined net earnings of that company and the Bethlehem Steel Co. to be \$3,883,730 per year. The fixed charges of the company are as follows: Interest at 5 per cent. on \$16,000,000 first mortgage bonds, \$800,000; sinking fund requirement, \$200,000; interest on \$10,000,000 collateral bonds, \$500,000; sinking fund requirement, \$200,000; total, \$1,200,000. Dividend on the 6 per cent. preferred stock will amount to \$1,200,000, leaving \$983,730 for betterments and interest on the common stock. The sum given as the estimated earnings includes \$500,000 to be saved through combination and co-ordination of plants. Lewis Nixon, president of the company, says that the expert estimate of the value of the company's physical property, \$18,000,000, is a most conservative one and that the plants could not be duplicated for that sum. He estimates their worth as "going concerns" at \$28,000,000, and the total value of all properties, including good will, at \$40,000,000. It is understood that application is to be made to the New York stock exchange for the listing of the stock.

#### THE NAVY'S GREATEST NEED.

Lieut. Com'dr. Roy C. Smith has an article in the current issue of the North American Review upon the subject, "The Navy's Greatest Need." He takes a view which most people overlook and emphasizes the need of men. He says:

"The navy, then, needs men as well as ships, a fact which most people probably scarcely ever think of, or if they do think of it, they suppose the officers and men are provided in some way as need is found for their services. But this is not the case; there can be no crews for the new ships unless something is done to provide them; and here is the most crying need of the navy at the present moment, one in comparison with which the question whether we authorize three or six ships, or none at all, at any session of congress, is now actually insignificant, a question too, of the very greatest concern to everybody, and one less likely to be fully considered from the very fact that the need is so little known. To illustrate the case still further, it is possible to compute the appointments that should be made annually to bring the navy up to proper strength in ten years, counting from 1903, which is the earliest date at which new appointments can now be made. There are at present completed and authorized about 800,000 tons of shipping. The average annual increase since the Spanish war (in one year there was no increase authorized) has been 54,000 tons. This is by no means an excessive rate; but, to be conservative and to allow for possible diminutions, assume that

40,000 tons (two-thirds the current appropriation) will represent the annual increase up to 1913, making a total at that time of 1,240,000 tons. At the ratio as above given this would require 3,720 officers. There are now about 1,060 officers on the list, counting the midshipmen who have passed the four years' course and are at sea. Thus, there must be an increase of 2,660 officers all told. The annual waste is now by law about 4 per cent. Suppose all voluntary retirements stopped and the waste cut down to 3 per cent. The average list from now till 1913 would be 2,390, 3 per cent. of which is 72 annually, or about 790 in eleven years, which added to 2,660 makes 3,450, the number of graduates required for the eleven years. There will be this coming year at the academy 466 midshipmen (495 less 29 for the new apportionment not yet in effect). Suppose three-fourths of them graduate, say 350. This, taken from the total number required as above, that is, 3,450 leaves 3,100 to be appointed and graduated under the new law. As the first appointment cannot be made till 1903, the first graduation will not be until 1907, and there will be seven classes altogether, up to and including 1913. Hence 3,100 must be divided by seven, which gives 443 as the number of annual graduates. Assuming still that three-fourths of those appointed graduate, there must be 591 appointments annually, beginning right away, or as soon as congress can act, in order to have the navy officered to the lowest estimate of efficiency by 1913. This would mean a midshipman battalion of about 2,000 instead of the present 500, roundly; or for the next ten years an appointment by each senator and representative, not every four years as now, but every year or oftener.

#### AN ENGLISHMAN ON AMERICAN ENTERPRISE.

The Liverpool Journal of Commerce publishes the following interesting article as the result of an interview with Mr. E. C. Constantine, president of the Manchester Association of Engineers, who had just concluded a business trip through the important industrial centers of the United States. Says the Journal of Commerce:

"First of all, he was struck by the marked indications of prosperity which characterized all the districts he visited. Judging from what he saw, the present large requirements for all descriptions of iron and steel materials were likely to be maintained, at any rate during the ensuing twelve months, as on every hand he found users in the greatest difficulty with regard to supplies to cover even pressing immediate wants. Everywhere, industrial developments in connection with buildings of various kinds, works, and electrical installations, were being pushed forward. A feature of American enterprise was the readiness with which capital could be obtained for new undertakings. The Americans were far more speculative than the people of this country; they were prepared to take risks in regard to new enterprises which would probably 'hang fire' in England, and the taking of these risks in the long run apparently pulled them through to successful results. A further notable feature was the elaborate and perfect system adopted generally for the handling of heavy masses of material expeditiously and automatically. In the case of the supply of ore and minerals for the modern blast furnaces, all the operations from unloading from the ship's hold to charging at the furnaces, with the necessary lime, coke, etc., were performed by automatic mechanical arrangements, worked with electrical power, the intervention of manual labor being altogether dispensed with. The same remark applied to the steel works, the handling of ingots and blooms from the steel furnaces to the mills being also done automatically chiefly by electrical, assisted in some case by hydraulic power. In fact, in the application of electricity in conjunction with automatic appliances for industrial operations, and the consequent large saving of expensive manual labor, works practice in the states was a long way ahead of English methods. He was also struck by the greater rate at which they worked in the engineering shops, particularly in the administrative and draughting departments. From the manager downwards they were at it ding-dong all day, and for much longer hours than would be thought of in this country. They paid higher wages, but they get more work per man out of their employes than we did in this country. On the whole, however, having had an opportunity of examining their highest samples of engineering work, he could honestly state that neither in design, workmanship, nor finish was it in any way superior to work of a similar class turned out in England. There was plenty of second-rate work to be found in America, as elsewhere, and one or two of the much vaunted establishments were certainly disappointing to him when he visited them. Despite the advantages the Americans possessed, he did not think he had much reason to feel despondent about their competition in engineering work in foreign markets."

The schooner yacht Ivanhoe, Edward Swann, New York Yacht Club, owner, has been sold to Col. W. E. Haskell, New York City, through the yacht agency of Arthur Masters, No. 29 Broadway, New York City. The sloop yacht Whitby, Col. W. E. Haskell, New York City, owner, has also been sold through the same agency to Edward Swann of the New York Yacht Club.

Lord Charles Beresford, rear admiral of the British navy, has just reached this country. It is understood that he intends to inquire closely into the development of the American navy.

## SHIP YARD NOTES

It is understood that the torpedo boat Talbot is to be fitted with oil burning apparatus as an experiment.

The cruiser Des Moines will be launched from the yards of the Fore River Ship & Engine Co., Quincy, Mass., on Sept. 20.

Sawyer Bros. Millbridge, Me., have under consideration an offer to build a three-masted schooner for Capt. George T. Jenkins of Jonesport.

The new packet being built at Howard's yard, Jeffersonville, Ind., for the St. Louis & Tennessee River Packet Line has been named Shiloh. She was launched recently.

George A. Gilchrist, Belfast, Me., launched last week the hull of the dredger for Cumberland sound. She was built at a cost of \$125,000 and has capacity for 1,000 tons.

The Dilworth Coal Co. of Pittsburg has given a contract to A. Axton & Son of West Brownsville, Pa., to build a pool steam towboat 121 ft. long, 23 ft. beam and 3 f. 7 in. depth of hold.

The Fred A. Davenport, four-masted schooner, was launched last week from the works of George Hawley, Bath, Me. The Davenport is 160 ft. long, 36 ft. wide and 13 ft. deep.

The Portland Ship Building Co., Portland, Me., will launch in a few days a tug for the Central Wharf Towboat Co. Her dimensions will be: Length over all, 90 ft.; beam, 20 ft.; depth, 9 ft.

It is understood that Cornelius Vanderbilt has ordered a new racing schooner yacht from the Herreshoffs at Bristol, R. I. She is to be 110 ft. on the water line and work is to be begun upon her in December.

At William McKie's yard, East Boston, Mass., the twin-screw steamer Concord was launched last week for the Boston-Iloilo Co. She is 130 ft. long, 25 ft. beam and 10 ft. deep. She has two compound engines. Her draught as noted, is light in order to permit her to navigate the shallow rivers of Luzon.

The Savannah Dry Dock & Ship Building Co. has been incorporated in the superior court of Georgia. George P. Baldwin, John P. Flannery, William Mackall, J. H. Estill and J. P. Williams were the petitioners. The purpose of the company is to build and repair vessels. The capital stock is \$600,000.

Thomas McCosker & Co., Baltimore, Md., have just launched the hull of a tugboat for the P. Dougherty Co. of Baltimore. The tug is 113 ft. 7 in. long, 22 ft. 6 in. beam and 10 ft. deep. Her machinery will be supplied by Thomas Basshor & Co. She will have a fore and aft compound engine with cylinders 15 and 30 in. in diameter and 24-in. stroke.

Theodore A. Crane's Sons, Brooklyn, N. Y., have several barges under construction for services in Cuban waters for James E. Ward & Co. Two of the barges are nearly ready for launching. In addition they have ready for launching a large harbor barge. The Fifth section for their large dry dock is well along and will be ready for launching about Oct. 15.

The new tug Charles E. Matthews of the Dailey Towing Line of New York was given her trial trip last week and proved satisfactory. She was built by Neafie & Levy, Philadelphia, Pa., and is of the following dimensions: Length, 102 ft.; beam, 22

ft. Two more tugs are building for the Dailey Line which now has a fleet of seventeen tugs, engaged in the coastwise towing service.

The United States Ship Building Co. have closed the contracts for two large steam vessels, the first being a side-wheel steamboat for the New Jersey Steamboat Co., better known as the Hudson River Albany Line. She will be the largest boat ever built to run on the Hudson river. Her dimensions will be: Length, 420 ft.; beam, 50 ft. 6 in.; beam over guards, 90 ft.; depth, 14 ft. 6 in. She will have three decks of staterooms having 450 rooms all told. Motive power will be supplied by one surface condensing beam engine with cylinders 81 in. in diameter and 12 ft. stroke. Steam will be supplied by four "lobster back" boilers, each 9 ft. 3 in. in diameter, 11 ft. wide and 33 ft. long with steam pressure of 55 lbs. The second contract is for a screw steamer for the Eastern Steamship Co. to run between Boston and Portland, Me. Her dimensions will be: Length, 320 ft.; beam, molded, 50 ft.; beam over guards, 62 ft.; depth, 21 ft. Motive power will be supplied by a triple-expansion engine of about 2,500 H. P., with cylinders 26, 43 and 71 in. in diameter and stroke of 42 in. She will be fitted with four Scotch boilers, 14 ft. in diameter, allowed 175 lbs. Both of these vessels will be built at the Harlan & Hollingsworth Co., Wilmington, Del. It is the intention of the combination to use this plant entirely for the building of merchant vessels as it has seven sets of ways and its equipment is especially adapted to that character of work.

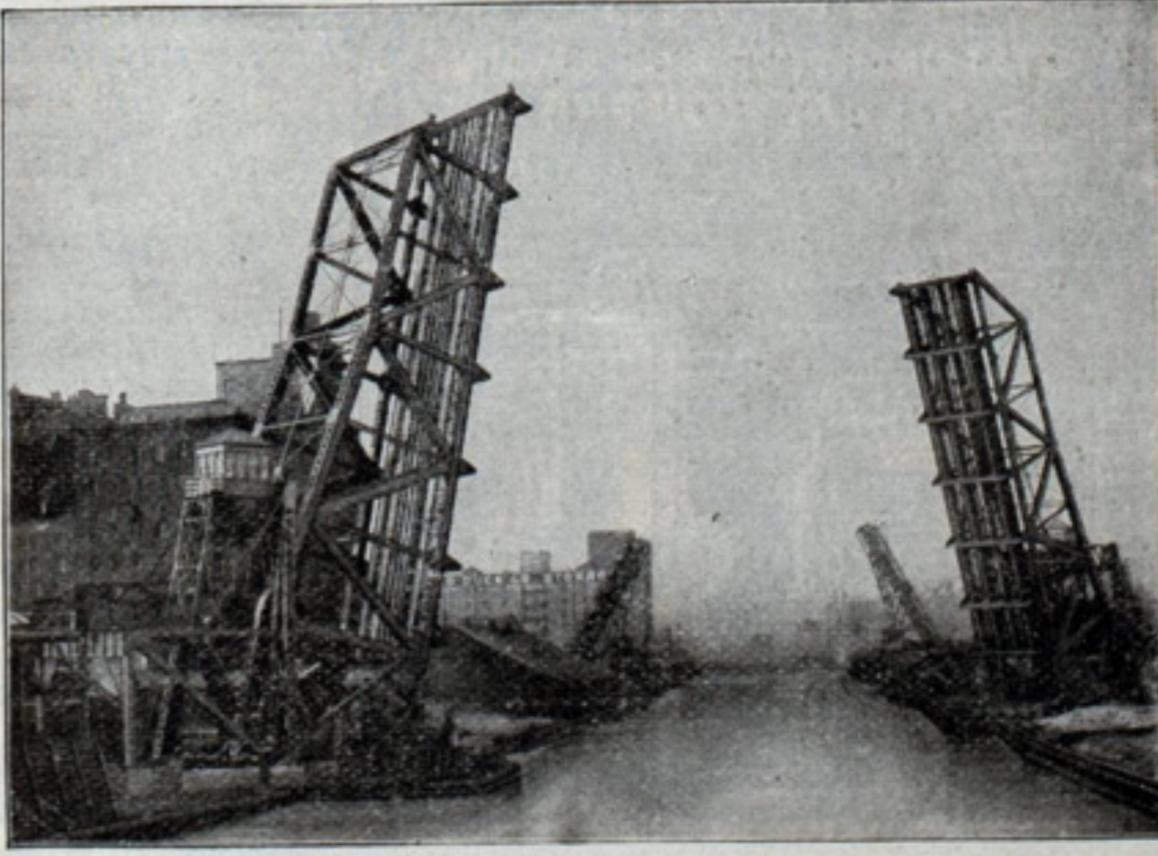
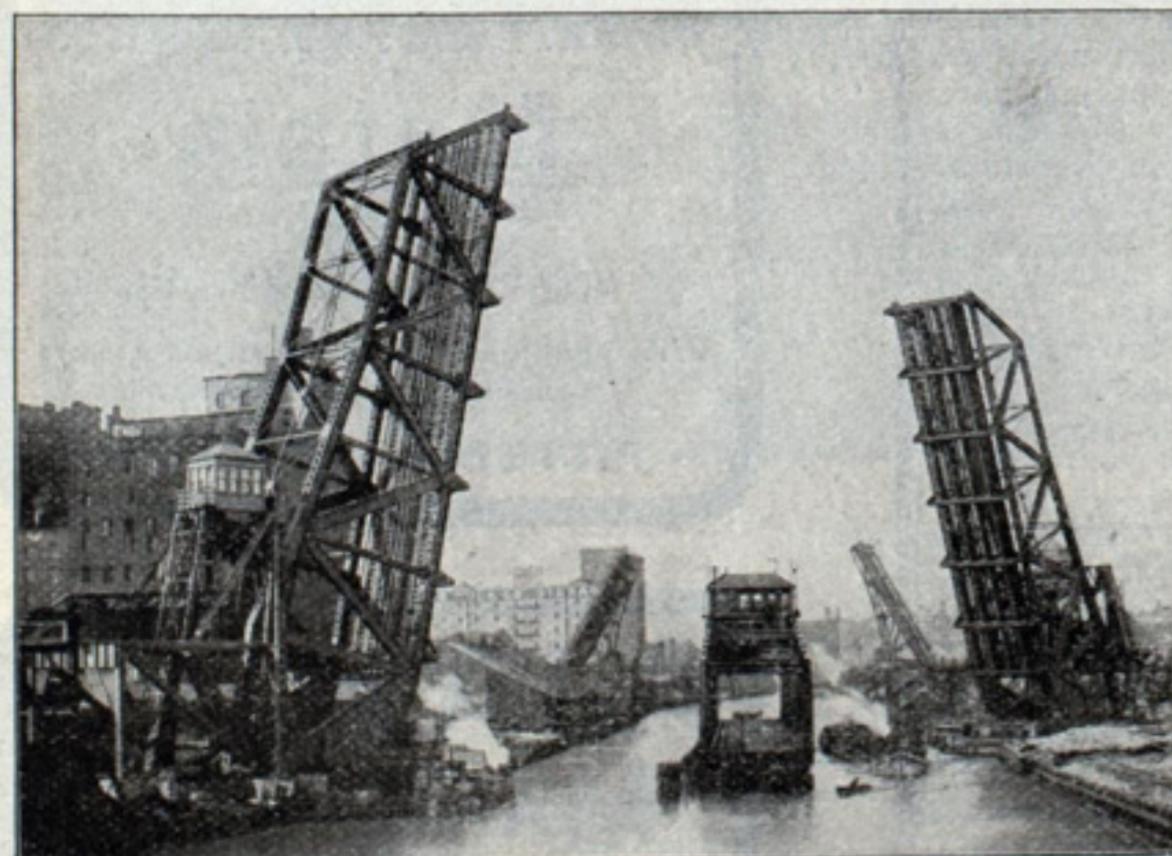
A steam dredge outfit, complete with all necessary tools and fixtures, patterns and extra castings, all ready for immediate use and in first-class condition, is offered for sale elsewhere in this issue at \$10,000 by M. Mitschkun Co., Detroit. The outfit consists of a dredge with two buckets of 2 and 3 yds. capacity, two dump scows, one boarding scow (furnished), and one fuel scow.

The Kronprinz Wilhelm of the Hamburg-American Line has finally done what she was designed to do—that is she has beaten the record of the Deutschland of the North-German Lloyd Line. Her latest trip from Cherbourg to New York was made in 5 days, 11 hours and 57 minutes, which is 26 minutes faster than the Deutschland's record. The run was 3,047 miles and the average speed 23.09 knots per hour.

Mr. T. E. De Garmo, No. 3116 Clifford street, Philadelphia, Pa., has been engaged by the Falls Hollow Staybolt Co., Cuyahoga Falls, O., as its eastern representative. Mr. De Garmo has had a number of years experience in the railway supply business, principally in the mechanical line, and having a most extended acquaintanceship is well qualified for his new office.

Calls for bound volumes of back numbers of the Review are often received at this office. We have for sale several volumes covering the last half of 1892, as well as the full year 1894.

Capt. E. H. C. Leutze has been selected to command the new battleship Maine.



TWO VIEWS OF

## THE SCHERZER ROLLING LIFT BRIDGE

across the Chicago River at entrance to the Grand Central Station, Chicago, before and after the removal of the old center pier swing bridge, showing the obstruction to navigation caused by the center pier and protection pier of the old swing bridge, and the wide and unobstructed channel given by the new Scherzer Rolling Lift Bridge.

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## LARGEST SAILING SHIP IN THE WORLD.

There is a popular impression that the seven-masted steel schooner Thomas W. Lawson, lately launched from the yards of the Fore River Ship & Engine Co., Quincy, Mass., is the largest sailing vessel in the world. This, however, is not the case. The largest sailing vessel in the world is the German five-masted, full-rigged ship Preussen. Her dimensions are: Length, 408 ft.; breadth, 53½ ft.; depth, 27 ft.; gross register tonnage, 5,142; carrying capacity, 8,500 tons deadweight. The Lawson's dimensions are: Length over all, 395 ft.; length on load line, 368 ft.; beam, 50 ft.; depth, 34 ft. 5 in.; carrying capacity, 8,100 tons, deadweight.

McIntyre & Henderson is the name of the new firm of ship builders at Baltimore. It is expected that their plant will go into operation during the present week. The firm has just bought the tug Bertha from the Spedden Ship Building Co. and will use it in connection with repair work.

## Small Tug For Sale.

Tug Norris. Length, 47 ft.; beam, 12 ft.; draught, 4 ft. Hull completely rebuilt last winter. Upright boiler, two years old, allowed 150 lbs. steam pressure. Engine 8x8. New Trout wheel. Everything in first-class shape. Suitable for light towing, delivering or ferry boat. Address

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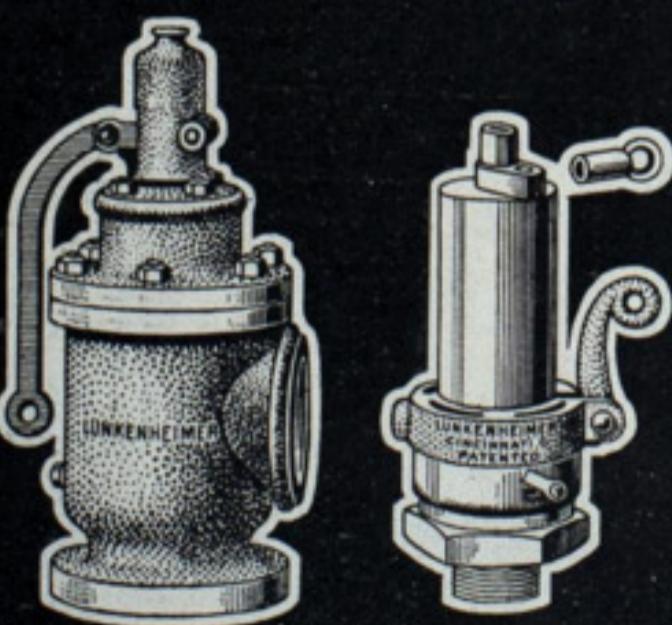
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